NOAA STACKS

June 1977 Number 394-Part I

JUL 20 1977

Solar-Geophysical Data prompt reports

Data for May 1977–April 1977

Explanation of Data Reports Issued as Number 390 (Supplement) February 1977

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Solar - Geophysical Data

NO. 394 JUNE 1977

Part I (Prompt Reports)

DATA FOR
MAY 1977
APRIL 1977

NATIONAL GEOPHYSICAL AND SOLAR - TERRESTRIAL DATA CENTER
BOULDER, COLORADO

For obtaining bulletins on a data exchange basis, send request to: World Data Center A for Solar-Terrestrial Physics, NOAA, Boulder, Colorado 80302.

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SOLAR - GEOPHYSICAL DATA

No. 394

Issued in two parts

Helen E. Coffey, Editor

J. Virginia Lincoln, Director
Solar - Terrestrial Data Services Division

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Note: A = Part I, B = Part II.

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ALERT PERIODS

INTERNATIONAL URSIGRAM AND WORLD DAYS SERVICE

MAY 1977

SUMMARY OF THE GEOALERT WWA MESSAGES

Message serial number	Date of issue	Date of obser-vation	Wolf number	10 cm solar flux	A index	Active Regions				Outstanding events	Forecasts			Alert Situations
						Location Lat-Long	No. of Flares Total	M	X		Date	Location Lat-Long	Desc*	
121	01	30	13	76	08	S19E17	0	0	0		01	S19E17	Q	SOLQUIET MAGALERT 01/06
122	02	01	23	76	08	S19E04	1	0	0		02	S19E04	Q	SOLQUIET MAGALERT 02/06
						N35E70	0	0	0			N35E70	Q	
123	03	02	20	77	42	N33E59	0	0	0		03	N33E59	Q	SOLQUIET MAGALERT 03/06
124	04	03	40	81	20	N31E49	2	1	0		04	N31E49	E	SOLQUIET MAGALERT 04/06
						S26W18	0	0	0			S26W18	Q	
125	05	04	22	81	11	N30E34	3	0	0		05	N30E34	E	SOLQUIET MAGALERT 05
126	06	05	22	78	10	N31E18	0	0	0		06	N31E18	Q	SOLQUIET MAGQUIET
						S22W46	0	0	0			S22W46	Q	
127	07	06	17	77	09	N31E07	2	0	0		07	N31E07	Q	SOLQUIET MAGQUIET
128	08	07	12	77	07	N31W07	3	0	0		08	N31W07	Q	SOLQUIET MAGQUIET
129	09	08	25	76	04	N31W19	3	0	0		09	N31W19	Q	SOLQUIET MAGQUIET
						S24E44	0	0	0			S24E44	Q	
130	10	09	25	82	06	N31W26	0	0	0		10	N31W26	Q	SOLQUIET MAGQUIET
						S20E82	0	0	0			S20E82	Q	
131	11	10	36	79	09	N31W45	0	0	0		11	N31W45	Q	SOLQUIET MAGQUIET
						S18E66	0	0	0			S18E66	Q	
						N20W42	0	0	0			N20W42	Q	
132	12	11	49	79	13	N30W58	0	0	0		12	N30W58	Q	SOLQUIET MAGQUIET
						N19W54	0	0	0			N19W54	Q	
						S22E04	0	0	0			S22E04	Q	
						S20E49	0	0	0			S20E49	Q	
133	13	12	47	78	17	N32W71	0	0	0		13	N32W71	Q	SOLQUIET MAGQUIET
						N21W66	0	0	0			N21W66	Q	
						S23W07	0	0	0			S23W07	Q	
						S20E37	0	0	0			S20E37	Q	
134	14	13	35	80	05	S23W19	0	0	0		14	S23W19	Q	SOLQUIET MAGQUIET
						S20E24	0	0	0			S20E24	Q	
						N30E24	0	0	0			N30E24	Q	
135	15	14	38	83	07	S21E11	1	0	0		15	S21E11	Q	SOLQUIET MAGALERT
						S22E25	0	0	0			S22E25	Q	
						N30E10	0	0	0			N30E10	Q	
						S23W32	0	0	0			S23W32	Q	
136	16	15	38	83	12	S19W02	0	0	0		16	S19W02	Q	SOLQUIET MAGNIL
						N32W02	0	0	0			N32W02	Q	
						S22E19	0	0	0			S22E19	Q	
137	17	16	31	83	16	S19W11	0	0	0		17	S19W11	Q	SOLQUIET MAGQUIET
						S22W02	0	0	0			S22W02	Q	
138	18	17	15	82	15	S19W24	0	0	0		18	S19W24	Q	SOLQUIET MAGQUIET
139	19	18	18	81	11	S20W40	0	0	0		19	S20W40	Q	SOLQUIET MAGQUIET
140	20	19	11	80	05	S23W59	1	0	0		20	S23W59	Q	SOLQUIET MAGQUIET
141	21	20	00	79	09	-	-	-	-		21	SPOTNIL		SOLQUIET MAGQUIET
142	22	21	33	81	05	N21W15	0	0	0		22	N21W15	Q	SOLQUIET MAGQUIET
						S25W31	0	0	0			S25W31	Q	
						N36W61	0	0	0			N36W61	Q	
143	23	22	12	82	08	N35W73	0	0	0		23	N35W73	Q	SOLQUIET MAGQUIET
144	24	23	00	80	08	-	-	-	-		24	SPOTNIL		SOLQUIET MAGQUIET
145	25	24	11	77	08	S19E22	0	0	0		25	S19E22	Q	SOLQUIET MAGQUIET
146	26	25	12	75	07	N19E65	1	0	0		26	N19E65	Q	SOLQUIET MAGQUIET
147	27	26	11	75	03	N19E52	0	0	0		27	N19E52	Q	SOLQUIET MAGQUIET
148	28	27	14	76	03	S22E19	0	0	0		28	S22E19	Q	SOLQUIET MAGALERT 29/31
149	29	28	25	77	07	S21E06	0	0	0		29	S21E06	Q	SOLQUIET MAGALERT 29/30
						N20W01	0	0	0			N20W01	Q	
150	30	29	47	80	03	S22W05	0	0	0		30	S22W05	Q	SOLQUIET MAGALERT 30/01
						N21W15	1	0	0			N21W15	Q	
						N22E70	0	0	0			N22E70	Q	
151	31	30	39	88	05	N20W28	1	0	0		31	N20W28	Q	SOLQUIET MAGALERT MINOR 31/01
						N22E56	0	0	0			N22E56	Q	
152	01	31	49	89	07	N17W40	0	0	0		01	N17W40	Q	SOLQUIET MAGALERT MINOR 01
						N18E42	0	0	0			N18E42	Q	

* Q=Quiet E=Eruptive A=Active P=Proton C=Caution D=Doubtful O.G.=Other Groups MF=Major Flare

RELATIVE SUNSPOT NUMBERS

ZURICH, R_z

	1976 FINAL							1977 PROVISIONAL				
DAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY
1	0	9	18	17	36	8	6	28	15	0	7	15
2	0	8	16	28	28	8	0	32	19	8	11	14
3	0	10	17	12	30	0	0	25	19	8	10	22
4	0	8	13	11	30	0	6	22	16	8	7	23
5	0	8	16	17	25	0	0	21	18	8	7	16
6	0	10	14	10	24	0	0	13	7	9	8	16
7	0	7	24	9	30	0	7	8	7	8	7	12
8	10	0	27	9	7	0	19	0	26	20	0	19
9	10	0	31	18	14	0	22	0	21	20	0	25
10	7	0	24	22	0	0	19	0	23	19	0	29
11	7	0	23	24	0	0	22	14	25	19	8	34
12	0	0	28	20	13	0	16	19	48	9	12	35
13	0	0	26	18	17	0	12	23	68	8	16	26
14	15	0	19	10	23	0	32	22	61	7	22	33
15	18	0	8	16	25	7	34	20	45	0	34	26
16	15	0	15	14	28	7	36	18	49	0	33	21
17	10	0	19	8	31	14	34	30	44	0	32	20
18	24	0	22	8	24	20	24	26	37	0	29	12
19	23	0	25	7	20	13	15	7	25	0	22	0
20	20	0	20	0	19	12	8	0	10	0	12	11
21	30	0	17	0	15	8	9	15	9	0	20	14
22	31	0	8	0	22	13	9	24	9	10	19	7
23	22	0	9	7	28	11	9	34	9	8	18	7
24	25	0	15	7	30	10	17	35	8	7	8	7
25	16	0	10	16	30	9	22	17	8	14	0	0
26	17	0	14	17	29	9	25	8	8	8	14	7
27	9	0	7	18	24	8	16	0	0	9	8	13
28	11	0	8	18	19	8	17	13	0	16	16	16
29	11	3	9	23	15	8	19	11		8	9	20
30	10	0	10	30	8	0	19	8		8	8	30
31		0	9		0		12	10		5		40
MEAN	12.2	1.9	16.4	13.5	20.6	5.2	15.3	15.7	22.6	8.0	13.2	18.4

1976 yearly mean = 12.6

DAILY SOLAR FLUX AT 2800 MHz
OTTAWA ARO

FLUX ADJUSTED TO 1 A.U., S_a

	1976							1977				
DAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY
1	68.4	69.3	75.9	76.3	74.6	70.9	70.2	73.8	81.7*	72.6	74.8	77.2
2	67.9	69.1	77.8	75.3	73.9	69.1	71.6	76.5	82.1	75.4	76.3	78.5
3	68.1	69.5	82.3	75.7	73.8	69.8	71.2	76.0	80.9	74.8	76.6	81.9
4	68.4	68.6	82.3	75.9	73.1	69.9	71.3	75.5	78.7	76.9	76.8	81.4*
5	68.7	69.5	84.2	75.4	74.8	70.9	70.1	74.0	77.8	77.6	75.5	79.6
6	69.3	69.6	84.3	73.1	74.7	69.7	70.1	72.4	75.2	77.6	76.1	78.5
7	69.6	69.5	83.7	73.0	74.5	69.5	69.7	71.4	74.6	77.2	75.5*	77.1*
8	70.7	69.7	82.0	72.9	74.6	69.3	70.8	69.6	78.6	81.6	74.3	77.9
9	70.1	69.7	82.8	73.2	74.8	70.7	74.3	68.4	83.1	80.3	74.8	83.6
10	71.8	70.1	82.8	75.8	74.9	69.4	76.8	68.8	83.5	80.5	76.5	80.8
11	71.4	70.2	80.4	75.7	73.7	70.5	78.3	71.2	84.6	78.9	79.2	80.8
12	71.7	69.8	80.6	75.7	73.3	70.8	78.6	74.9	86.9*	78.6	80.2	79.7
13	72.8	69.8	78.7	74.3	72.6	69.4	78.1	77.5	88.5	77.9	82.7	81.5
14	73.7	70.7	73.4	74.7	74.4	69.2	81.0	74.5	85.2	77.2	83.4	84.8
15	74.3	71.4	72.8	73.9	75.5	71.1	79.8	75.6	84.4	74.8	86.8	85.0
16	77.1	69.8	72.9	75.8	77.0	71.1	77.8	77.5	85.7	74.1	83.7	85.1
17	77.1	69.4	77.8	76.5	78.0	72.8	75.5	76.1	89.6*	74.1	83.6	84.1
18	77.9	70.6	78.2	74.3	77.3	75.6	73.8	75.4	86.5	73.9	80.8	82.9
19	76.9	70.2	76.1	73.3	76.8*	74.6*	72.9	76.9	82.8	74.0	79.8*	82.1
20	76.9	69.4	74.5	72.2	75.8	72.9	71.7	75.2	81.1	72.3	80.4*	81.3
21	77.7	70.1	73.2	70.9	73.5	73.2	71.8	74.3	78.6	72.8	80.8	81.4
22	78.9	70.1	72.3	70.5	75.4	73.3	73.4	76.8	75.9	74.6	80.1	82.9
23	78.5	68.7	70.8	72.0	80.1	72.5	73.7	78.7	75.9	74.7	77.5	82.4
24	75.2	69.4	70.9	72.5	80.1	72.9	74.2	77.4	74.2	74.8	76.5	79.2
25	74.9	68.8	70.6	73.4	84.7	72.7	75.6	74.9	74.3	74.0	76.4	77.4
26	74.3	68.5	70.1	72.8	80.4	72.1	75.6	76.0	72.3	75.1	75.4	76.8
27	72.8	69.4	71.5	73.3	77.4	73.7	75.2	75.3	72.0	74.5	74.9	77.9
28	71.8	69.4	72.8	73.6	73.8	71.7	74.5	77.1	72.6	74.4	74.2	79.1
29	71.3	69.4	73.8	71.9	72.1	69.7	74.8	76.1		75.4	74.8	81.7
30	70.3	70.7	73.0	72.6	72.1	69.7	75.1	76.3		74.6	76.6	89.9
31		72.3	73.8		78.4		76.4	79.6		74.1		92.8
MEAN	72.8	69.8	76.6	73.9	75.4	71.3	74.3	74.9	80.3	75.8	78.2	81.4

a adjusted for burst

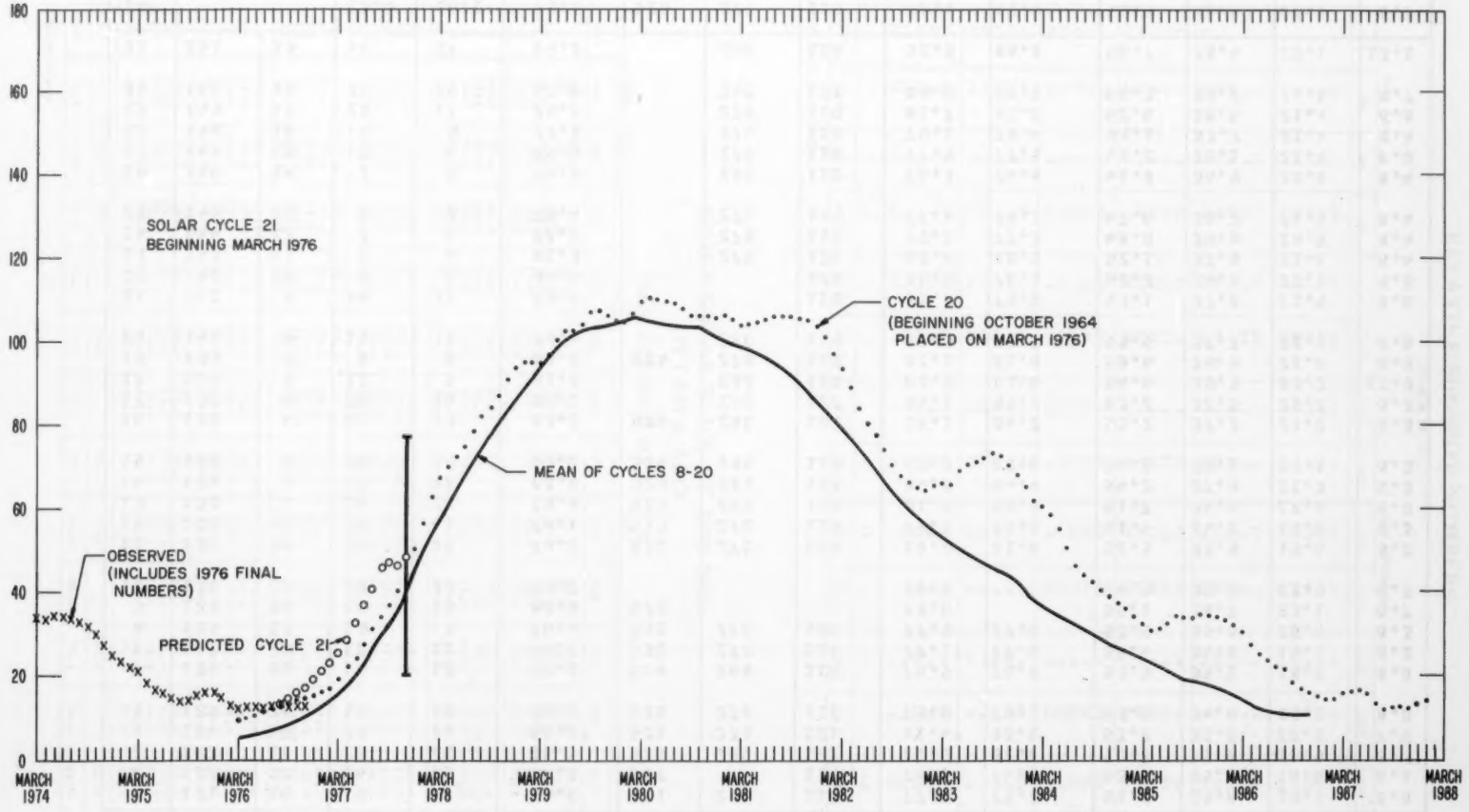
DAILY SOLAR INDICES

MAY 1977

MAY 1977	YEAR DAY	BARTELS 27-DAY CYCLE NUMBER	SUNSPOT NUMBERS		OBSERVED FLUX	SOLAR FLUX ADJUSTED TO 1 A.U.								
			R_Z	$R_{A'}$	OTTAWA 2800	AFGL 15400	AFGL 8800	AFGL 4995	OTTAWA 2800	AFGL 2695	AFGL 1415	AFGL 606	AFGL 410	AFGL 245
1	121	16	15	14	76.0	531	274	117	77.2	75.2	51.0	35.6	19.5	8.0
2	122	17	14	11	77.3	517		114	78.5	74.9	52.9	35.2	18.6	8.1
3	123	18	22	21	80.5	530	280	121	81.9	82.7	52.3	35.7	18.9	8.3
4	124	19	23	21	80.0*	521	278	121	81.4*	83.0	53.2	33.5	22.2	7.5
5	125	20	16	19	78.2	525	272	117	79.6	79.1	53.5	34.6	18.2	8.0
6	126	21	16	13	77.1	518	268	116	78.5	76.0	53.9	35.1	18.8	8.0
7	127	22	12	11	75.7*	532	272	116	77.1*	77.5	55.4	34.3	19.2	8.3
8	128	23	19	13	76.4	530	278	120	77.9	77.6	53.9	35.8	20.4	8.3
9	129	24	25	19	82.0	523			83.6		55.0	38.7	23.1	8.7
10	130	25	29	28	79.2				80.8		54.9	35.9	20.9	8.5
11	131	26	34	35	79.2	520	271	119	80.8	81.6	52.9	33.9	19.6	8.3
12	132	27	35	41	78.1	519	272	119	79.7	78.0	51.5	34.2	19.6	8.3
13	133	1	26	28	79.8	529	273	118	81.5	80.6	51.7	34.4	17.0	8.0
14	134	2	33	27	83.0	523	281	122	84.8	84.4	54.2	37.9	22.3	8.3
15	135	3	26	19	83.2	534	286	122	85.0	83.0	54.0	38.1	23.1	8.3
16	136	4	21	23	83.2	526	280	123	85.1	84.2	55.2	37.2	21.2	8.3
17	137	5	20	16	82.2		275	122	84.1	81.0	53.2	37.5	20.2	8.3
18	138	6	12	6	81.0		283	120	82.9	81.6	54.6	35.0	23.3	12.9
19	139	7	0	0	80.2	526	278	119	82.1	81.6	55.6	36.9	22.6	8.9
20	140	8	11	9	79.4		280	119	81.3	79.2	55.6	37.7	22.3	8.6
21	141	9	14	11	79.4			118	81.4	79.0	53.1	37.8	21.5	8.6
22	142	10	7	2	80.9			120	82.9	76.8	52.3	39.8	22.0	9.5
23	143	11	7	3	80.3		275	120	82.4	80.8	52.1	37.0	21.6	8.4
24	144	12	7	1	77.2		278	117	79.2	77.3	48.0	36.8	20.5	8.4
25	145	13	0	2	75.4		275	114	77.4	75.2	47.6	36.2	21.4	8.4
26	146	14	7	5	74.8		280	115	76.8	74.8	46.0	36.9	22.0	8.4
27	147	15	13	5	75.9		275	116	77.9	77.5	48.8	38.1	21.4	8.0
28	148	16	16	9	77.0		274	118	79.1	78.4	51.1	37.7	21.4	8.4
29	149	17	20	17	79.5		278	119	81.7	82.2	52.6	38.5	21.4	8.8
30	150	18	30	29	87.5		282	127	89.9	88.2	56.3	39.7	24.8	8.7
31	151	19	40	37	89.5		280	126	92.0	88.8	56.7	38.4	25.1	13.1
MEAN			18.4	16.0	79.6	526	277	119	81.4	80.0	52.9	36.6	21.1	8.7

* Adjusted for burst.

Note: Data gaps in AFGL Sagamore Hill data are due to equipment problems.



PREDICTED AND OBSERVED SUNSPOT NUMBERS

SMOOTHED OBSERVED AND PREDICTED SUNSPOT NUMBERS
CYCLE 21

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1976	15.2	13.2	12.2	12.6	12.5	12.2	12.9	13.9	14.1	13.3	13.3	15.0 (1)
1977	16.8 (3)	16.6 (4)	21.0 (6)	23.7 (8)	27.0 (10)	30.5 (12)	33.9 (15)	37.3 (18)	40.7 (21)	44.6 (25)	49.0 (28)	53.5 (31)
1978	58.0 (35)	63.1 (38)	67.8 (41)	71.4 (45)	74.6 (48)	77.7 (51)	80.9 (52)	85.0 (52)	89.9 (54)	94.0 (56)	97.8 (57)	101.4 (59)
1979	104.4 (59)	106.8 (61)	109.7 (64)	113.2 (67)	115.9 (68)	117.5 (69)	118.3 (70)	118.6 (71)	118.4 (71)	117.9 (70)	117.7 (68)	117.9 (66)
1980	118.4 (66)	118.1 (66)	116.9 (64)	115.6 (62)	114.4 (60)	113.8 (59)	113.6 (59)	113.0 (59)	112.9 (59)	113.3 (60)	112.7 (60)	110.9 (58)
1981	108.8 (56)	107.7 (55)	106.7 (52)	106.3 (50)	106.1 (49)	105.7 (47)	104.9 (47)	103.3 (44)	101.0 (42)	98.2 (40)	95.5 (39)	93.1 (39)
1982	91.2 (37)	89.2 (35)	86.6 (34)	83.1 (33)	79.3 (31)	76.4 (29)	72.9 (25)	70.2 (24)	67.2 (23)	64.1 (22)	62.1 (21)	60.8 (21)
1983	59.4 (21)	57.6 (21)	55.6 (22)	54.4 (22)	53.6 (23)	52.4 (25)	51.3 (26)	50.3 (27)	49.6 (27)	48.6 (27)	47.0 (27)	44.7 (26)
1984	42.0 (27)	39.9 (28)	38.8 (29)	37.5 (29)	35.8 (30)	34.3 (29)	33.1 (27)	32.1 (26)	30.9 (26)	29.7 (25)	28.5 (25)	27.5 (24)
1985	26.9 (25)	26.1 (24)	25.0 (23)	24.0 (22)	23.2 (21)	22.6 (21)	21.8 (21)	20.7 (22)	20.1 (22)	20.1 (22)	19.9 (22)	19.2 (21)
1986	18.2 (20)	17.2 (19)	16.2 (18)	15.1 (17)	14.3 (16)	13.7 (15)	13.3 (14)	13.0 (13)	12.6 (11)	12.3 (10)	12.2 (10)	12.4 (10)
1987	12.9 (11)	13.5 (12)	14.2 (13)	15.0 (14)	15.8 (15)							

For each month, the upper figure is the observed or predicted Zürich smoothed sunspot number. The lower figure in parenthesis is the corresponding absolute value of the 90% prediction interval, an indication of the uncertainty above and below the predicted number. Observed numbers are those with no prediction intervals. The observed smoothed sunspot numbers are based on final Zürich numbers through 1976.

The predicted sunspot numbers are derived from a regression analysis based on cycles 8 through 20. Tests indicate that earlier cycles are from a different statistical population.

Hα SOLAR FLARES

MAY 1977

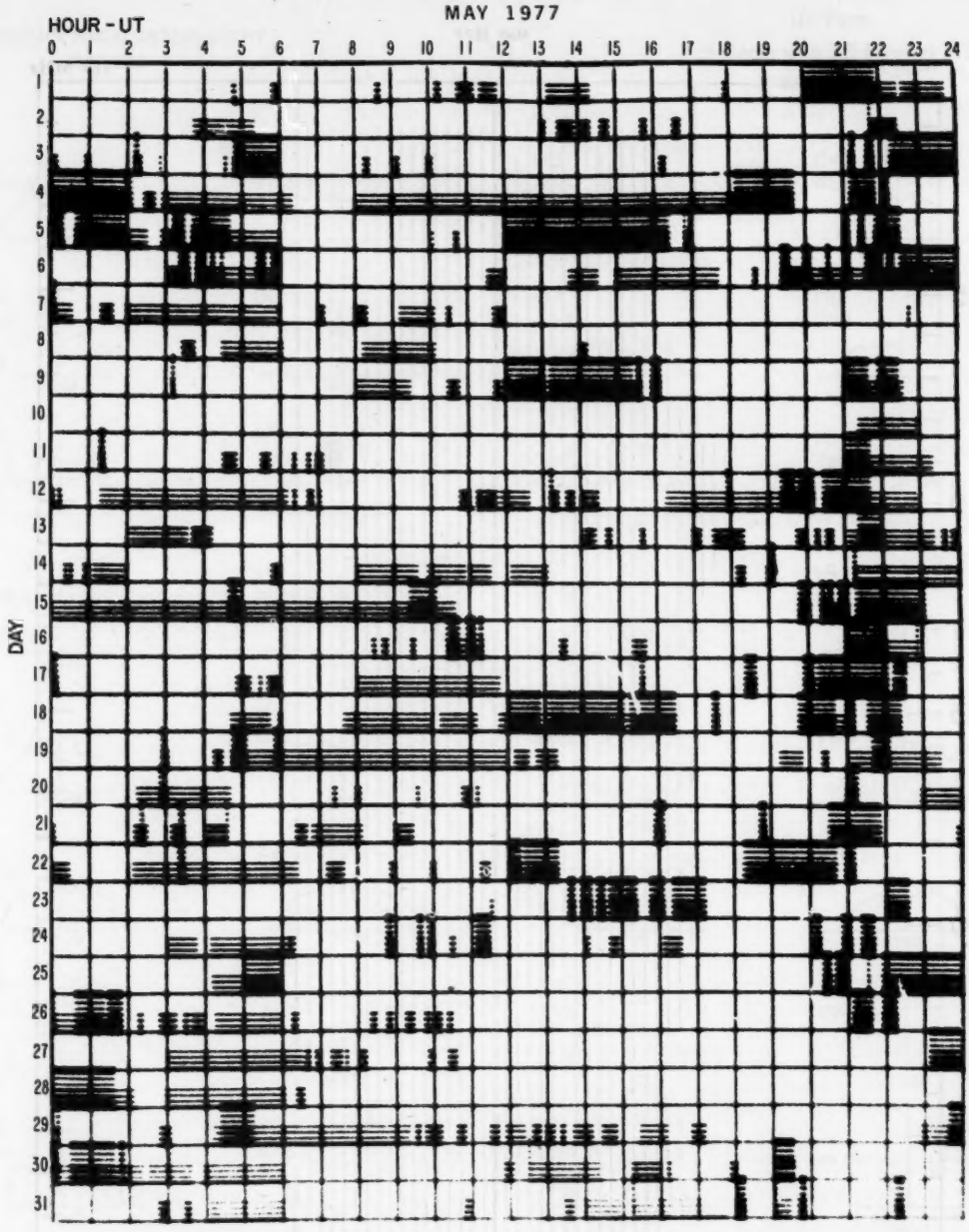
OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS
	DATE MAY	START	MAX. PHASE	END	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	MCMATH PLAGE REGION	CMP DAY	MIN.		CORD.	TYPE	TIME — UT	MEAS. AREA Mill. of Disk	CORR. AREA Sq. Deg.	
MITK	03	0140	0146	0201	N34	E64	.954		7.9	21	SF		C	0146	60		D
BUCA	03	0620		0653	N33	E60	.935	14749	7.8	33	1N		C	0627	107	3.0	
CATA	03	0705E	0710	0710D	N31	E58	.919		7.6	5D	SB	2		0710	56	1.3	
BUCA	03	0708		0735	N31	E60	.930		7.8	27	SN		C	0709	64	1.7	D
UPIC	03	0925E	0929U	0931	N34	E61	.942		8.0	6D	SF		P	0929	20	27.0	
CATA	03	0925	0925	1000D	N32	E57	.917		7.7	35D	SN	2		0925	56	1.3	
UPIC	03	0942	0942	0952	N35	E58	.930	14749	7.8	10	1F		P	0942	122	57.0	
MONT	03	1048	1058	1124	N33	E58	.925		7.8	36	SN		C	1058	110		
MCMA	03	1428	1450	1525	N32	E55	.906	14749	7.7	57	SN		C	1450	30	.5	E
CATA	03	1430E	1436	1440D	N34	E56	.917	14749	7.8	10D	1N	2		1430	84	2.0	
MCMA	03	1756	1810	1835	N32	E54	.900	14749	7.8	39	SB		C	1810	60	1.1	EH
RAMY	04	1120E	1125	1136	N34	E45	.854		7.8	18D	SN	3	C		178		FDE
RAMY	04	1640E	1641U	1652	N33	E42	.829		7.8	12D	SF	3	C		128		F
RAMY	04	1725E	1728U	1741D	N33	E42	.829		7.9	16D	SF	3	C		96		FDE
BUCA	06	0630		0717	N35	E24	.732	14749	8.1	47	1N		C	0637	214	3.1	
MANI	06	0633E	0640	0655	N33	E20	.690		7.8	22D	SN	2		0640	80	1.1	F
BUCA	06	074u		0805	N34	E23	.716		8.0	25	SN		C	0744	107	1.5	E
RAMY	06	2041E	2042	2049	N31	E 5	.610		7.2	8D	SF	2	C		95		DE
MANI	07	0249E	0251	0259	N31	E02	.605		7.3	10D	SF	2		0251	40	.5	
MCMA	07	1654	1655	1712	N36	E04	.674	14749	8.0	18	SN		C	1655	70	.7	E
MANI	07	2324E	2326	2340	N31	W08	.615		7.4	16D	SF	2		2326	60	.7	F
MITK	07	2348	2353	2402	N32	W10	.634		7.2	14	SN		C	2353	110	1.4	E
MANI	07	2350	2352	2359	N31	W31	.738		5.7	9	SF	2		2352	50	.6	FH
MONT	09	0931E	0931	1003D	S24	E90	.999		16.1	32D	SF		C	0931	20		
MCMA	09	1048E		1110	S24	E42	.696	14768	12.6	22D	SN		P	1053	35	.5	DH
ATHN	09	1053E	1054	1058	S25	E42	.700		12.6	5D	SF		1		33	80.0	
MCMA	09	1105	1112	1140	N32	W26	.712	14749	7.5	35	SN		C	1112	20	.3	DH
CATA	12	1525	1525	1540	S25	E48	.763		16.2	15	SF	2		1525	56	.9	
MCMA	16	1717	1721	1740	S18	W09	.263	14771	16.0	23	SF		C	1721	20	.2	EH
MITK	19	0019	0027	0059	S19	W39	.648		16.1	40	SB		C	0027	140	1.9	E
MCMA	19	1415		1434	S18	W48	.749	14771	16.0	19	SN		C	1427	25	.4	D
RAMY	19	1424E	1426U	1429	S18	W49	.760		15.9	5D	SF	3	C		48		
MONT	20	1034	1037	1044	S27	W11	.410		19.6	10	SF		C	1037	20		G
CATA	28	0615	0615	0620D	S21	E17	.396		29.5	5D	SF	2		0615	28	.3	
PALE	29	2023	2026	2035	N20	E74	.973		5.4	12	SF	3	C		25		F R
CATA	30	1040	1045	1100D	N17	W24	.528		28.6	20D	SB	2		1045	28	.3	
MONT	30	1040	1051	1104	N19	W23	.537		28.7	24	SN		C	1051	80		E
MCMA	30	1222E		1230D	N18	W25	.548	14785	28.6	8D	SF		P	1228	30	.4	D
WEND	30	1232		1242	N20	W26	.577		28.6	10	SN						
RAMY	30	1420E	1421U	1426D	N20	W25	.567		28.7	6D	SF	3	C		32		FDE
MCMA	30	1426E		1440	N18	W26	.559	14785	28.7	14D	SN		P	1426	25	.3	D
MCMA	30	1609		1622	N21	W23	.558	14785	28.9	13	SB		P	1609	25	.3	DH
MCMA	30	1654	1657	1830D	N19	W26	.568	14785	28.8	96D	SN		C	1657	50	.6	E
MCMA	30	1853		1859D	N20	E62	.910	14794	5.4	6D	SF		C	1858	15	.2	D
MCMA	31	1104	1111	1128	N22	W34	.673	14785	28.9	24	SN		C	1111	50	.7	EH
CATA	31	1105E	1115	1140D	N21	W36	.687		28.8	35D	SB	2		1115	56	.7	
CATA	31	1125	1130	1140D	N20	E52	.834		5.4	15D	SN	2		1130	28	.5	
MCMA	31	1128	1130	1145	N20	E54	.851	14794	5.5	17	SN		C	1130	25	.5	D

"Remarks":

A = Eruptive prominence whose base is less than 90° from central meridian.
B = Probably the end of a more important flare.
C = Invisible 10 minutes before.
D = Brilliant point.
E = Two or more brilliant points.
F = Several eruptive centers.
G = No visible spots in the neighborhood.
H = Flare accompanied by a high speed dark filament.
I = Active region very extended.
J = Distinct variations of plage intensity before or after the flare.
K = Several intensity maxima.
L = Existing filaments show signs of sudden activity.
M = White-light flare.
N = Continuous spectrum shows effects of polarization.
O = Observations have been made in the calcium II lines H and K.
P = Flare shows helium D_3 in emission.
Q = Flare shows the Balmer continuum in emission.
R = Marked asymmetry in Hα line suggests ejection of high velocity material.
S = Brightness follows disappearance of filament (same position).
T = Region active all day.
U = Two bright branches, parallel (||) or converging (Y).
V = Occurrence of an explosive phase: important and abrupt expansion in about a minute with or without important intensity increase.
W = Great increase in area after time of maximum intensity.
X = Unusually wide Hα line.
Y = System of loop-type prominences.
Z = Major sunspot umbra covered by flare.

INTERVALS OF NO FLARE PATROL OBSERVATION

FOR PRECEDING SOLAR FLARE TABLE

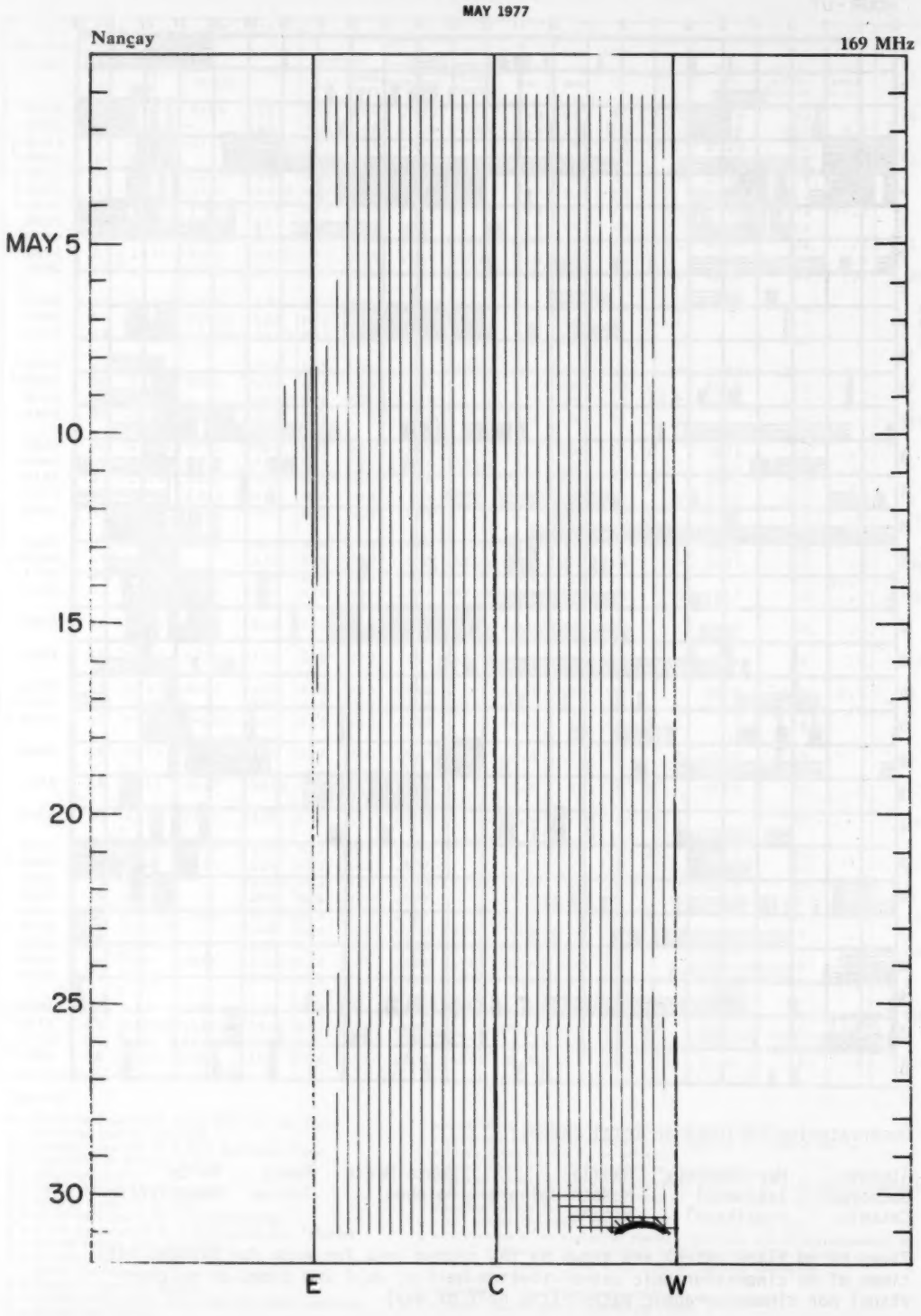


Observatories included in total patrol:

Athenes	Herstmonceux	Manila	Monte Mario	Ramey	Upice
Bucharest	Istanboul	McMath-Hulbert	Palehua	Tehran	Wendelstein
Catania	Kodaikanal	Mitaka			

Times of no flare patrol are shown by the shaded area for each day divided into times of no cinematographic patrol (bottom half of day) and times of neither visual nor cinematographic patrol (top half of day).

SOLAR RADIO EMISSION
INTERFEROMETRIC OBSERVATION

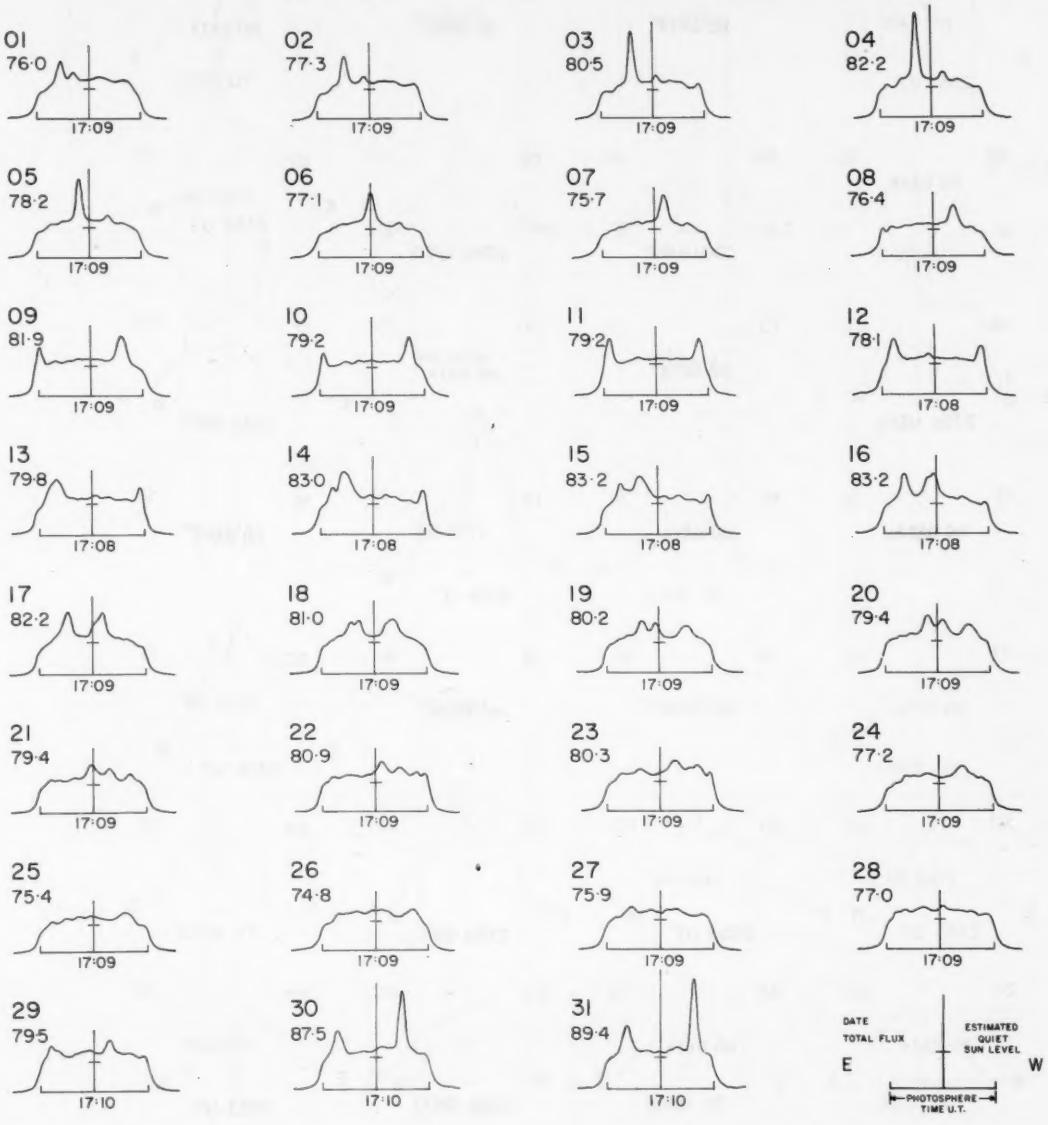


EAST-WEST SOLAR SCANS

MAY 1977

ALGONQUIN RADIO OBSERVATORY
CANADA

10·7cm
Fan Beam with 1·5 minutes of arc
E-W Resolution



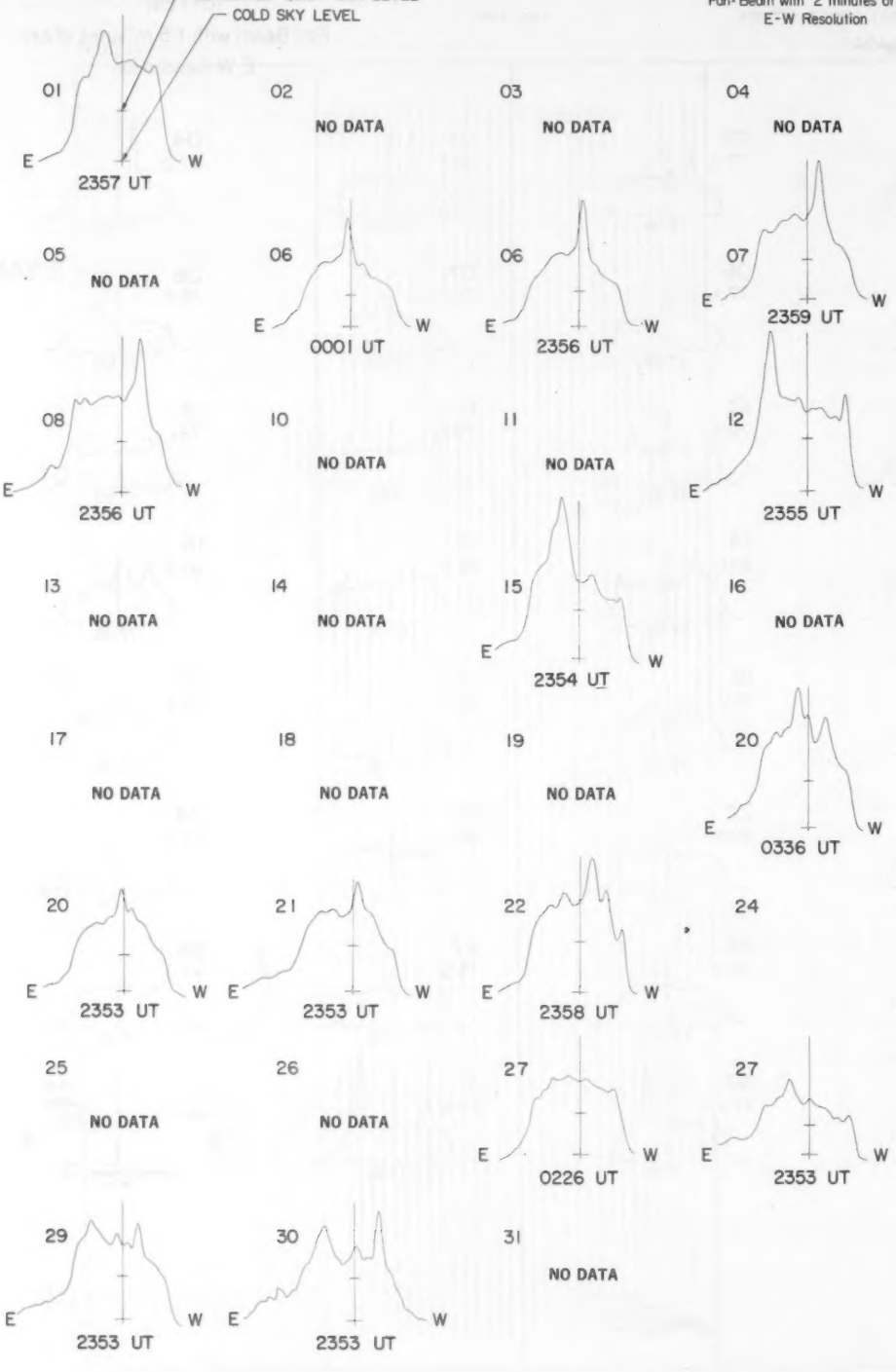
EAST-WEST SOLAR SCANS

MAY 1977

Fleurs, Australia

ESTIMATED QUIET SUN LEVEL
COLD SKY LEVEL

21 cm
Fan-Beam with 2 minutes of arc
E-W Resolution



EAST-WEST SOLAR SCANS

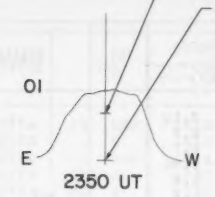
MAY 1977

Fleurs, Australia

ESTIMATED QUIET SUN LEVEL

COLD SKY LEVEL

43 cm
Fan-Beam with 4 minutes of arc
E-W Resolution

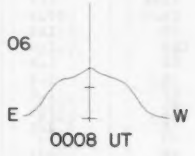


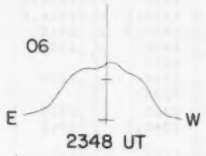
02 NO DATA

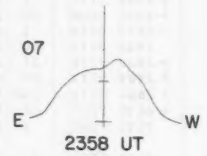
03 NO DATA

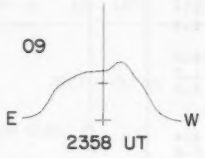
04 NO DATA

05 NO DATA









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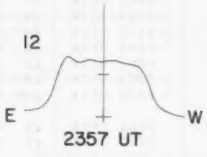

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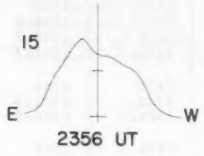
14 NO DATA



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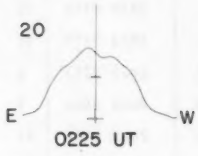
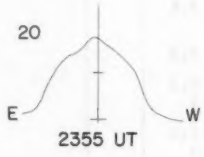
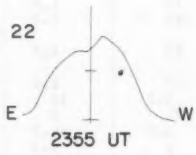
18 NO DATA

19 NO DATA







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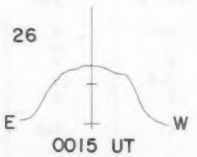
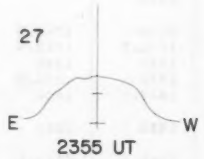
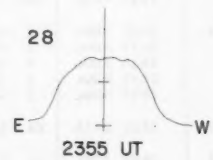
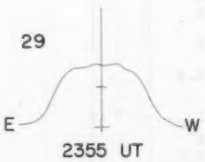
24 NO DATA

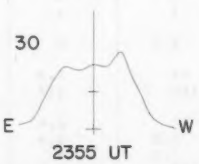
25 NO DATA











31 NO DATA

SOLAR RADIO EMISSION
SELECTED FIXED FREQUENCY EVENTS

MAY 1977

	FREQUENCY	STATION	TYPE	STARTING TIME	TIME OF MAXIMUM	DURATION	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1}		INT	REMARKS
				UT	UT	MINUTES	PEAK	MEAN		
3	2800	OTTA	40 F	1342	1343	2	2.8			
	2695	SGMR	20 GRF	1431.9	1452.9	83.1U	7	2.1U		1
	2800	OTTA	21 GRF	1445	1450	65	1.2	0.7		
	2800	OTTA	1 S	1448	1449	2	1.4	0.7		
	8800	SGMR	20 GRF	1449.1	1459.4	65.9U	6.4	1.9U		1
	2800	OTTA	21 GRF	1750	1815	45	1.2	0.6		
	2695	SGMR	20 GRF	1804.9	1812.5	25.1	5.5	1.7	SWF	2
	2800	OTTA	1 S	1805	1806.2	2.5	1.2	0.6		
	8800	SGMR	20 GRF	1805.1	1818.7	24.9	30.8	9.2	SWF	2
	2800	OTTA	1 S	1809.5	1812	5	1.8	1		
	2800	OTTA	20 GRF	1930	2100	160	2.6	1.4		
	2800	OTTA	27 RF	2218		80	1.6	1.2		
	2800	OTTA	24 R	2218	2223	5	1.6	0.8		
	2800	OTTA	24P R	2223		42	1.6			
	2695	PENT	26 FAL	2305	2338	33	-1.6	-0.8		
	2695	PENT	1 S	2345.5	2346	1	3.2	1.2		
4	2800	OTTA	20 GRF	1110	1116.2	35	1.8	0.8		
	2800	OTTA	27 RF	1233		137	1.2	1		
	2800	OTTA	24 R	1233	1305	32	1.2	0.9		
	2800	OTTA	24P R	1305		75	1.2			
	2800	OTTA	26 FAL	1420	1450	30	-1.2	-0.6		
	2800	OTTA	22 GRF	1530	1635	195	3	1.5		
	2800	OTTA	240 R	2015	2100	45	1.2	0.6		
	2800	OTTA	24P R	2100		240 D	1.2			
5	2800	OTTA	20 GRF	2057.8	2059	30	0.8	0.4		
	2800	OTTA	20 GRF	2150	2205	40	1.2	0.6		
6	2800	OTTA	21 GRF	1520	1523	12	1.2	0.6		
	2800	OTTA	40 F	1521	1522.5	2	2.2			
	2695	BOUL	23 GRF	1522	1523.5	1	4	1		
	2800	OTTA	6 S	2036.3	2036.3	0.1	4.4			
7	2800	OTTA	20 GRF	1650	1700	30	1.2	0.6		
	2695	PENT	1 S	2322	2322.3	2.5	8.4	4.2		
	2695	PENT	29 PBI	2324.5	2324.5	4.5	1.2	0.6		
9	2800	OTTA	240 R	1100	1210	70	4	2		
	2800	OTTA	26 FAL	1655	1745	10	-0.8	-0.4		
	2800	OTTA	26 FAL	1910	2000	50	-1.4	-0.7		
11	2800	OTTA	32 ABS	1825	1905	95	-1	-0.5		
12	2800	OTTA	1 S	1522	1522.5	2	1.6	0.8		
13	2695	BOUL	1 S	1758	1759.5	4	3	1		
14	2800	OTTA	20 GRF	1310	1330	50	1	0.5		
15	2695	PENT	240 R	2235	2250	15	1.2	0.6		
	2695	PENT	24P R	2250		160 D	1.2			
17	2800	OTTA	20 GRF	2204	2210	80	1.6	0.8		
19	2695	PENT	240AR	0013	0040	27	1.6	0.8		
	2695	BOUL	23 GRF	0015.5	0019.5	4.3	12	4		
	2695	PENT	21 GRF	0019	0021	21	2	1		
	2695	MANI	3	0021	0024	6.5	14.2	5.5		1
	2695	PENT	2 S/F	0022.2	0024	6	8.8	3		
	2695	PENT	24P R	0040		65 D	1.6			
20	2695	BOUL	2 SF	1748	1748.5	2.5	9	3		
	2695	BOUL	2 SF	1751.5	1753.5	2	7	2		
	2695	BOUL	2 SF	1804	1805	1	7	9		
	2695	BOUL	8 S	1830	1830.5	1.5	19	6		
	2695	BOUL	1 S	1833.5	1834	2	3	1		
22	2800	OTTA	20 GRF	1930	2000	70	1.2	0.6		
23	2695	BOUL	45 C	2046.5	2049.5	4	5	2		
	2695	BOUL	40 F	2107.5	2111	5	4	1		
24	2695	BOUL	40 F	1858	1901.5	6.5	6	2		
29	2695	PENT	240 R	2200	2255	55	1.8	0.9		
	2695	PENT	24P R	2255		160 D	1.8			
30	2800	OTTA	240AR	1038	1050	12	2.4	1.2		
	2800	OTTA	1 S	1044.5	1046.5	5.5	8.4	2		
	2695	SGMR	1 S	1045.2	1046.5	3.5	8	2.4		1
	2800	OTTA	24P R	1050		100	2.4			
	2800	OTTA	240 R	1225	1235	10	1.2	0.6		
	2800	OTTA	24P R	1235		85	1.2			

SOLAR RADIO EMISSION
SELECTED FIXED FREQUENCY EVENTS

MAY 1977

	FREQUENCY	STATION	TYPE	STARTING TIME	TIME OF MAXIMUM	DURATION	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1}		INT	REMARKS
				UT	UT	MINUTES	PEAK	MEAN		
	2800	OTTA	21 GRF	1410	1425	60	2	1		
	2800	OTTA	1 S	1412	1413.5	3	1.4	0.7		
	2800	OTTA	2 S/F	1608.5	1608.8	2	1.6	1.2		
	2800	OTTA	27A RF	1735		230	2.4	2.2		
	2800	OTTA	24 R	1735	1755	20	2.4	1.2		
	2800	OTTA	24P R	1755		185	2.4			
	2800	OTTA	20 GRF	1900	1920	35	0.8	0.4		
	2800	OTTA	26 FAL	2100	2125	25	-1.4	-0.7		
	2800	OTTA	20 GRF	2139	2147	70	1.8	0.9		
31	2800	OTTA	27 RF	1100		205	1.4	1.2		
	2800	OTTA	24 R	1100	1105	5	1.4	0.7		
	2800	OTTA	24P R	1105	1340	155	1.4			
	2800	OTTA	26 FAL	1340	1425	45	-1.4	-0.7		
	2800	OTTA	20 GRF	1640	1655	50	1	0.5		
	2800	OTTA	32 ABS	1830	1900	130	-1.4	-0.7		

Observatories:

BOUL = Boulder MANI = Manila OTTA = Ottawa ARO PENT = Penticton SGMR = Sagamore Hill

Explanation of Type Code:

1 Simple 1
2 Simple 1F
3 Simple 2
4 Simple 2F
5 Simple
6 Minor
7 Minor +
8 Spike
20 Simple 3
21 Simple 3A
22 Simple 3F
23 Simple 3AF
24 Rise
25 Rise A
26 Fall
27 Rise and Fall
28 Precursor
29 Post Burst Increase
30 Post Burst Increase A
31 Post Burst Decrease
32 Absorption
40 Fluctuation
41 Group of Bursts
42 Series of Bursts
43 Onset of Noise Storm
44 Noise Storm in Progress
45 Complex
46 Complex F
47 Great Burst
48 Major
49 Major +

SOLAR X-RAYS BY SATELLITE
SMS GOES
MAY 1977

.5 - 4Å Hourly Averages (10^{-5} watts/m^2)

MO DA	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Mean
5/ 1	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/ 2	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	0.71	B	B	B	B	B	B	B	0.03
5/ 3	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	0.03	B	B	B	B	B	B
5/ 4	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/ 5	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/ 6	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/ 7	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/ 8	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	0.02	B	B	B
5/ 9	B	B	M	M	M	M	M	M	M	M	M	M	M	B	B	B	B	B	B	B	B	B	B	B	B
5/10	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/11	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/12	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/13	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/14	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/15	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	M	M	M	M	M	M	M	B
5/16	M	M	M	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/17	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/18	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/19	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/20	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/21	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/22	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/23	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/24	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/25	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/26	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B@	B	B	B	B	B	B	B	B
5/27	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	M	B	B	B	B	B	B	B	B
5/28	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/29	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/30	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/31	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B

Note: "B" indicates the flux was below the cut-off levels.
"M" denotes periods of missing data.

SOLAR X-RAYS BY SATELLITE
SMS GOES
MAY 1977

1 - 8Å Hourly Averages (10^{-4} watts/m^2)

MO DA	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Mean
5/ 1	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/ 2	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	0.07	B	B	B	B	B	B	B	0.02
5/ 3	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	0.03	B	B	B	B	B	B
5/ 4	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/ 5	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/ 6	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/ 7	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/ 8	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/ 9	B	B	M	M	M	M	M	M	M	M	M	M	M	B	B	B	B	B	B	B	B	B	B	B	B
5/10	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/11	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/12	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/13	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/14	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/15	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	M	M	M	M	M	M	M	B
5/16	M	M	M	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/17	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/18	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/19	0.01	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/20	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/21	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/22	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/23	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/24	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/25	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/26	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/27	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	M	B	B	B	B	B	B	B	B
5/28	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/29	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/30	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5/31	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B

Note: "B" indicates the flux was below the cut-off levels.
"M" denotes periods of missing data.

SOLAR X-RAYS BY SATELLITE

GOES-1

MAY 1977

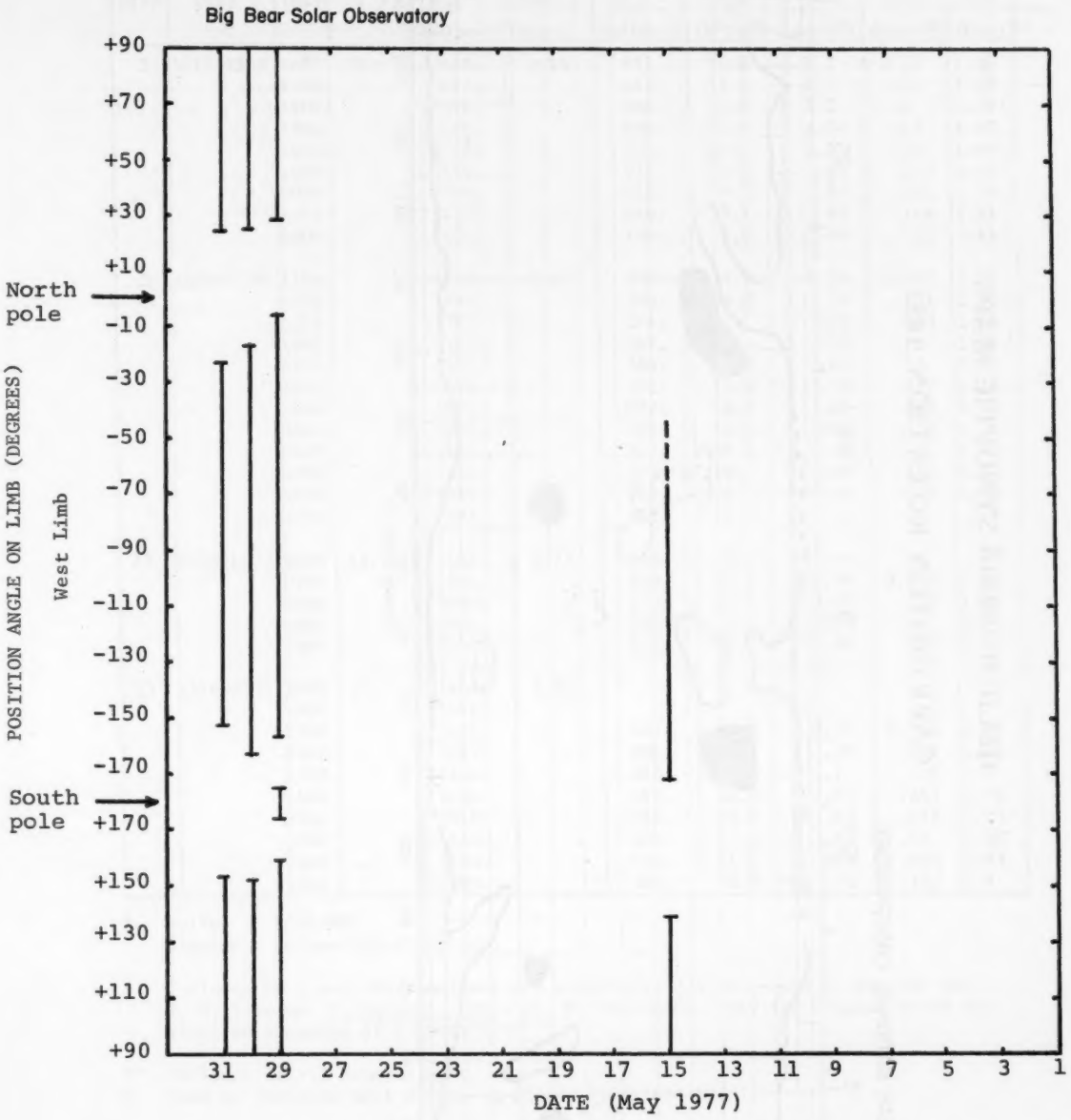
DAY	BEGIN TIME	.5-4A Wm^{-2}	1-8A Wm^{-2}	MAX TIME	.5-4A Wm^{-2}	1-8A Wm^{-2}	1/2P TIME	.5-4A Wm^{-2}	1-8A Wm^{-2}
3	1428	0.0E+00	1.6E-07	1452	5.4E-07	4.5E-06	1500	1.1E-07	2.2E-06
3	1802	4.7E-09	2.5E-07	1813	2.1E-06	1.2E-05	1819	4.2E-07	6.5E-06
3	2213	0.0E+00	1.4E-07	2227	1.9E-07	2.0E-06	2244	3.2E-08	1.0E-06
4	1103	0.0E+00	6.6E-08	1122	2.7E-07	2.8E-06	1129	4.2E-08	1.3E-06
4	1208	0.0E+00	8.7E-08	1215	2.4E-07	2.1E-06	1218	5.2E-08	9.2E-07
6	0630	6.0E-09	1.7E-07	0638	1.8E-07	2.0E-06	0646	4.1E-08	1.0E-06
30	1037	0.0E+00	1.1E-07	1045	1.9E-07	1.8E-06	1052	3.8E-08	8.9E-07
30	1410	3.0E-09	2.8E-07	1419	8.6E-08	1.2E-06	1433	2.1E-08	7.4E-07
30	1604	9.7E-10	2.3E-07	1610	8.6E-08	1.1E-06	1613	1.6E-08	6.1E-07
31	1101	0.0E+00	2.0E-07	1113	8.4E-08	1.3E-06	1118	1.4E-08	6.7E-07

Errata: The January - April 1977 X-ray event flux data appearing in SGD issues 390, 391, 392, and 393 Part I are 1000 times too large. A computer programming error printed the data in units of Ergs/cm^2/s instead of Watts/m^2/s.

CORONAL HOLES

Helium D3 Chromosphere at Solar Limb

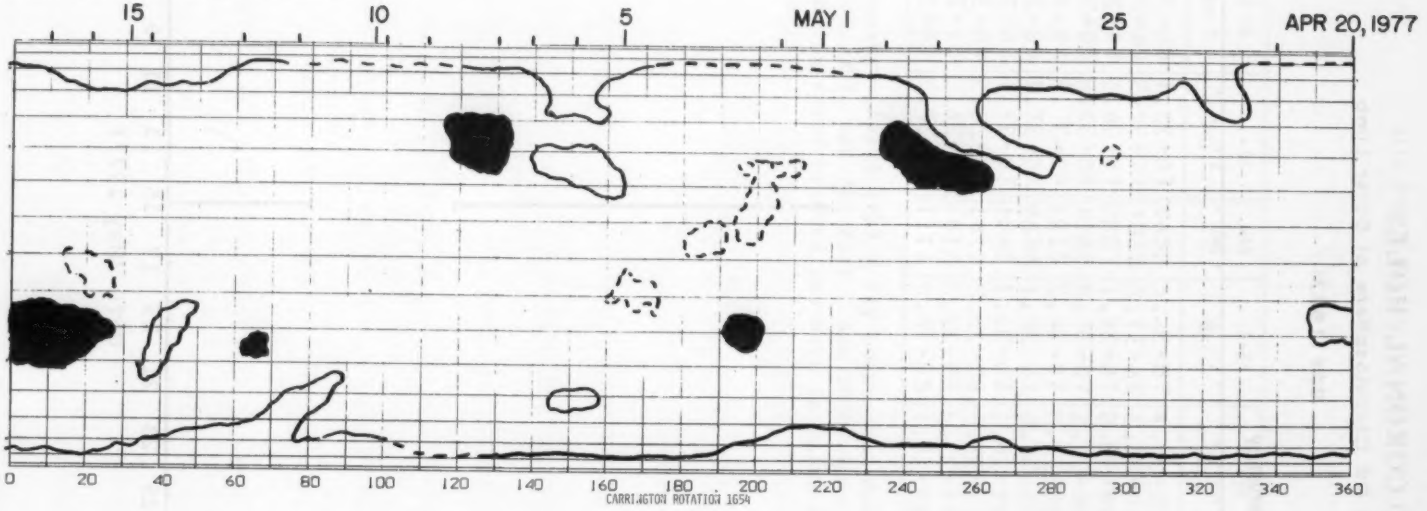
MAY 1977



HELIUM 10830Å SYNOPTIC MAPS

CARRINGTON ROTATION 1654

KITT PEAK NATIONAL OBSERVATORY



PIONEER VI

MAY 1977

Date May 1977	DSN Coverage (UT)	Data Time (UT)	ESP (°)	SOLAR WIND AMES[1] U_{H^+} (km/sec)	AMES[1] TAU (days)	MIT U_{H^+} (km/sec)	MIT N_{H^+} (H^+/cc)	COSMIC RAY PROTONS[2] (particles/sec) 6-13 (Mev*)	13-175 (Mev**)	>175 (Mev)
3	1417-2200	1400	20.6	448.	2.15	451.	14.6	1.2	0.15	1.56
		1500		477.		445.	12.3	1.1	.11	1.55
		1600		448.		468.	11.9	1.2	.1	1.57
		1700		448.		428.	10.4	1.05	.13	1.55
		1800		448.		428.	9.2	1.1	.14	1.66
		1900		448.		431.	9.3	.98	.135	1.55
		2000		448.		428.	9.5	.87	.123	1.64
		2100		477.		440.	9.1	.98	.148	1.61
		2200		477.		430.	5.9	1.04	.123	1.61
5	1055-2130	1100		383.	2.22	372.	13.3	0.58	0.147	1.64
		1200		383.		366.	8.8	.57	.131	1.68
		1300		383.		374.	13.	.55	.163	1.46
		1400		383.		362.	12.	.59	.12	1.69
		1500		383.		360.	11.5	.62	.12	1.61
		1600		383.		372.	11.9	.55	.117	1.76
		1700		383.		372.	12.9	.61	.113	1.66
		1800		383.		390.	16.5	.57	.125	1.74
		1900		383.		373.	19.3	.58	.13	1.43
		2000		383.		375.	18.	.57	.145	1.43
		2100		383.		360.	18.	.44	.116	1.53
		2200		383.		360.	18.	--	--	--
15	0558-1000	0600	16.5	566.	1.77	566.	9.7	--	--	--
		0700		566.		570.	11.5	0.56	0.126	1.85
		0800		566.		570.	10.9	.53	.118	1.86
		0900		566.		549.	9.7	.55	.12	1.74
		1000		566.		612.	8.7	.56	.089	1.81
23	1316-2131	1300	13.	448.	1.82					
		1400		448.						
		1500		448.		402.	8.8	0.72	0.114	1.83
		1600		383.		389.	7.2	.69	.127	1.88
		1700		416.		397.	8.6	.7	.144	1.9
		1800		448.		392.	8.3	.67	.143	1.78
		1900		416.		385.	9.9	.64	.141	1.85
		2000		448.		408.	13.4	.52	.13	1.88
		2100		383.		415.	11.1	.65	.148	1.83
		2200		383.		383.	6.9	.73	.142	1.9

[1] Wolfe - NASA/ARC
[2] Simpson - University of Chicago

* Includes He 0.6-13 Mev/nucleons and electrons ~0.5 Mev - see J. Retzler and J. A. Simpson, J. Geophys. Res., 74, 9, 2149-2160, 1969 for discussion of the electron response of Pioneer VII.

** Includes He >13 Mev/nucleons.
Q Used to indicate that a rate is at its quiescent level.

ESP = Earth-Sun Probe Angle.

† Peak velocity

Note: Data sampled hourly unless otherwise noted.

Note: This coverage was obtained as a result of PN-6 alignment with Helios.

PIONEER IX

MAY 1977

Date May 1977	DSN Coverage (UT)	Data Time (UT)	ESP (°)	SOLAR WIND[1]				IP E-FIELD[2]	IMF[3]		COSMIC RAY PROTONS[4] (particles/sec)	
				U_{H^+} (km/sec)	N_{H^+} (H^+/cc)	T_{H^+} ($\times 10^{6}$°K)	TAU (days)	400 Hz (mv)	|B| (γ)	φ (°)	>13.9 Mev	>40 Mev
6	1405-2200	1400	38.1	430.			3.64	0.152	9.1	171.	6.95	0.53
		1500		449.				.206	5.4	130.	6.82	.65
		1600		468.				.206	6.7	104.	6.94	.58
		1700		504.				.25	7.2	152.	6.95	.56
		1800		504.				.179	8.2	287.	6.88	.7
		1900		523.				.191	11.4	328.	6.91	.69
		2000		542.				.225	12.4	012.	6.98	.61
		2100		542.				.235	13.8	023.	6.86	.52
		2200		542.				.229	14.9	021.	6.9	.55
8	0941-2159	1000	37.	486.			3.73	0.117	5.3	333.	6.94	0.6
		1100		468.				.113	5.4	326.	6.92	.64
		1200		449.				.133	7.6	341.	6.91	.52
		1300		449.				.171	9.5	347.	6.91	.54
		1400		468.				.222	9.3	329.	6.84	.64
		1500		449.				.253	10.	337.	6.89	.67
		1600		430.				.329	9.	316.	6.88	.51
		1700		449.				.297	8.4	333.	6.83	.51
		1800		430.				.299	10.9	357.	6.81	.56
		1900		417.				.27	9.3	358.	6.85	.54
		2000		390.				.329	8.	314.	6.85	.59
		2100		449.				.242	9.1	020.	6.75	.72
		2200		449.				.206	8.5	346.	6.85	.66

[1] Wolfe - NASA/ARC
[2] Scarf - TRW, Inc.
[3] Sonett and Colburn - NASA/ARC
[4] Webber - Univ. of N.H.

* Peak velocity

Note: Data sampled hourly unless otherwise noted.

ESP = Earth-Sun Probe Angle.

Note: This coverage was obtained as a result of PN-9 alignment with Helios.

SOLAR WIND

Interplanetary Scintillations

MAY 1977

UCSD 74 MHZ SCINTILLATIONS

DAY	3C48 VEL	3C48 ERR	3C144 VEL	3C144 ERR	3C147 VEL	3C147 ERR	3C161 VEL	3C161 ERR	3C237 VEL	3C237 ERR	3C273 VEL	3C273 ERR	3C298 VEL	3C298 ERR	3C459 VEL	3C459 ERR
1	422	7	374	3	376	19	504	15							313	28
2	659	27	328	13	467	46	548	6			535	10			323	36
3	492	18	335	9	431	39	537	36							386	1
4	419	7	319	6	463	1	444	23	323	27					418	42
5	545	52	416	1			714	212			408	11			499	57
6	652	4	347	2			687	25								
7	663	0			406	59	616	85							390	98
8	657	8	412	22	339	12										
9	645	18	399	8	481	98	393	1			404	46				
9							417	17								
10	550	9	543	50	375	25									337	36
11	495	13	344	3	418	7	473	41			343	3	362	67	401	20
12	572	3	349	8	369	38	568	12	398	55	431	6	411	18	443	74
13	596	7	340	15									257	5		
14	523	3	358	8			492	40			379	0	297	5	311	41
15	510	2	336	1	465	18	507	23					418	4	359	4
17							462	6								
18	647	27	287	0	618	58	463	78								
19	621	6	304	4	414	31	486	29								
20	492	6			497	63	489	56								
21	506	2	324	11			372	27					574	28	408	6
22	712	44	330	10			506	24			408	28				
23	770	7	429	2			542	56			480	1	364	6	528	147
24	780	22	415	41	493	13	557	84			346	32			485	71
25	749	15	366	4	393	18	464	11			428	38				
26	716	13	479	21	490	76	529	6								
27	578	12	481	20	457	12	573	20							360	50
28	532	63	597	*	468	17	459	*			366	49				
29	474	26	555	14	439	56	488	54			412	*				
30	439	5	520	0	482	91	586	68			275	5	400	30		
31	513	3	523	19	299	55	514	11	529	81	330	9	376	8	361	17

MAY 5	UT	LAT	DIST	DLON
3C48	19.	56.	0.40	34.
3C144	23.	-8.	0.62	-52.
3C147	22.	17.	0.74	-37.
3C161	0.	-24.	0.84	-26.
3C237	4.	-6.	1.12	-15.
3C273	6.	-3.	1.24	-9.
3C298	8.	0.	1.28	-4.
3C459	16.	6.	0.82	34.

15	UT	LAT	DIST	DLON
3C48	18.	43.	0.49	44.
3C144	22.	-9.	0.48	-61.
3C147	21.	25.	0.64	-43.
3C161	24.	-30.	0.76	-31.
3C237	3.	-5.	1.07	-16.
3C273	5.	-2.	1.22	-11.
3C298	7.	1.	1.27	-6.
3C459	16.	4.	0.90	25.

25	UT	LAT	DIST	DLON
3C48	18.	33.	0.59	43.
3C144	22.	-10.	0.33	-71.
3C147	21.	35.	0.55	-45.
3C161	23.	-37.	0.68	-34.
3C237	2.	-4.	1.02	-17.
3C273	4.	-1.	1.18	-13.
3C298	6.	2.	1.25	-8.
3C459	15.	3.	0.96	17.

NOTE:

* indicates data for which no error estimate is available since only two antennas were operating.

3C 161 observed at 0 hr. UT until May 9, at 23 hr. UT after May 9.

INFERRED IP MAGNETIC FIELD

BARTELS ROTATION	DATE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
1945	OCT 24					TA		*				A*	*		*	AT-	AT-	AT	AT						*			
1946	NOV 20		*		TA		T*	T*			-	-	-	*	*				AT	AT					*			
1947	DEC 17	-						TA*			*	AT*	TA		*					T*		*			A*	TA*		*	
1948	1976 JAN 13	TA	T*	TA		TA	TA	AT				-	*		-	-		-	-	-							TA	
1949	FEB 9				-	-		-	TA		AT	A*	TA							T*					*		TA	TA*
1950	MAR 7							-	TA	A*		TA						*	*	AT			T*			-	TA	
1951	APR 3							*				*								AT	TA	T*	T*		*	AT	TA	A*	
1952	APR 30		AT					TA	AT	T*	-			-	-	-			A*	TA	AT	AT		A*			-	
1953	MAY 27	-						*	TA						-	*			-					T*				
1954	JUN 23						AT			AT		TA	T*	AT			TA	A*					AT	TA	A*	AT	AT		A*
1955	JUL 20		T*								TA	A*								AT	T*	TA	TA	TA-	TA	TA		
1956	AUG 16							TA	T*							*		AT			-	AT-	AT-	AT-	TA-		-	-
1957	SEP 12	-	-	AT-	-	-	-	-	-	-	-	AT	-	-	AT-	AT-	-	-	-	-	-			AT			-	
1958	OCT 9	AT*	A*		A*		*				TA		A*		*	-	-	-	*		TA	AT	AT	-			AT	
1959	NOV 5	AT	TA			TA		T*			*	AT*				*											*	
1960	DEC 2							TA			*					AT							-	*		-	TA-	
1961	DEC 29	-	AT-	*	*	*			AT				*			*	A*		*	*				*				AT
1962	1977 JAN 25			-			-	-	TA-		A*			AT-			*	-				*	-		TA			
1963	FEB 21	AT	-	-	-	-	TA		TA			*										-		-				
1964	MAR 20		TA		AT					*			-	-						A*				-				
1965	APR 16			TA		TA	-	AT	TA		TA		AT			-	-	TA		AT	AT			TA				AT	
1966	MAY 13	TA	-	-		TA			TA											AT								

▒ = definitely towards the sun □ = definitely away from the sun

T = towards the sun A = away from the sun * = effect doubtful or not discernible - = missing data

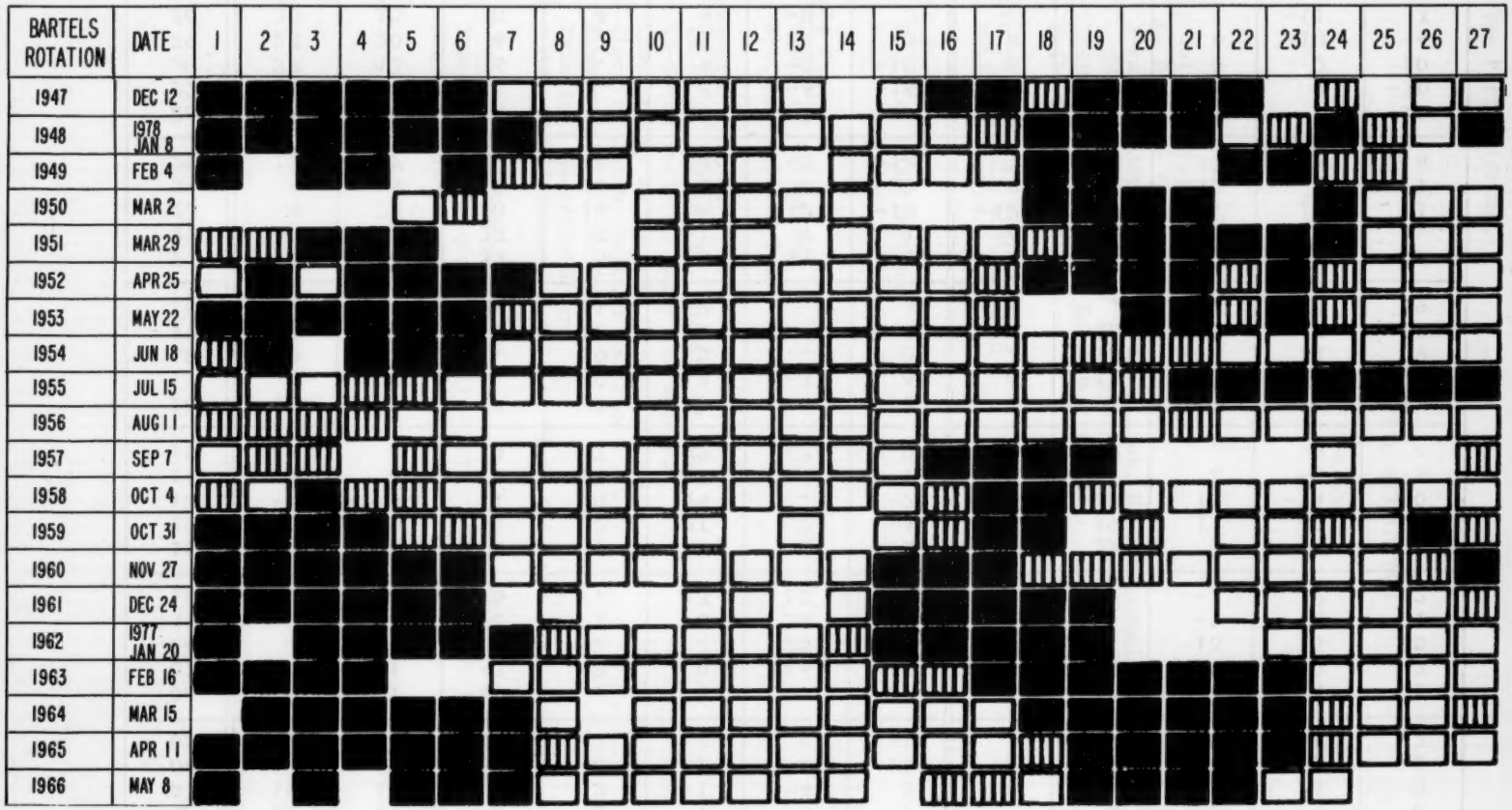
The table shows daily inferences of the polarity of the interplanetary magnetic field. The first half of the day is based principally on magnetograms produced by the magnetometer at the Vostok Antarctic Station of the USSR. The magnetometer of the U.S. Air Weather Service now operated at Thule by the Danish Meteorological Institute is used for the second half of the day.

Note: The Bartels Rotation numbers after Rotation number 1955 were incorrect in this Table in SGD issues 385 Part I through 389 Part I.

Source: Thule data for December 5, 6, 10, 11, 12, and 13, 1976 have been [illegible]

The table shows daily inferences of the polarity of the interplanetary magnetic field. The first half of the day is based principally on magnetograms produced by the magnetometer at the Vostok Antarctic Station of the USSR. The magnetometer of the U.S. Air Weather Service now operated at Thule by the Danish Meteorological Institute is used for the second half of the day.
Note: The Bartels Rotation numbers after Rotation number 1955 were incorrect in this Table in SGD issues 385 Part I through 389 Part I.

STANFORD MEAN SOLAR MAGNETIC FIELD



POLARITY OF THE MEAN SOLAR MAGNETIC FIELD: □ = FIELD >2μT, ▥ = -2μT ≤FIELD ≤2μT, ■ = FIELD <-2μT

No box visible indicates no data available for that day.

Note: Data are taken daily at 2000 UT.

STANFORD MEAN SOLAR MAGNETIC FIELD (MICROTESLA)

	1976							1977				
	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MARCH	APRIL	MAY
DAY												
01	20	17	8	5	.	-2	-4	.	5	2	-7	-13
02	21	19	6	6	.	-3	-2	.	0	0	-17	-6
03	15	15	0	2	-1	-4	5	4	-6	-2	-16	-5
04	16	14	-8	8	1	1	13	15	-8	-9	-12	1
05	6	7	-14	7	7	1	21	.	-11	-17	-9	7
06	8	-1	-10	6	-5	7	23	3	-17	-22	-4	11
07	0	-1	-5	3	0	16	25	-7	-12	-20	0	7
08	.	1	-4	-2	2	25	18	-14	.	-13	5	-5
09	.	3	-3	1	6	23	13	-9	.	-9	8	.
10	-5	6	-5	.	13	12	8	-11	.	-3	2	-22
11	-3	6	2	0	19	.	-3	-8	21	3	-4	.
12	0	10	-1	2	21	9	-4	.	19	11	-7	-29
13	-6	9	1	8	24	.	-7	.	13	18	-14	-20
14	1	8	-2	12	29	4	-1	8	11	3	-8	-5
15	13	8	4	17	22	-2	0	6	9	.	-8	4
16	16	5	7	20	19	-4	0	9	-3	-9	-11	12
17	8	4	.	30	14	-3	6	6	-12	-12	-9	20
18	0	1	.	20	5	.	3	3	-13	-13	1	29
19	-6	0	.	15	-1	0	8	0	-20	-15	13	27
20	.	4	24	11	-9	.	6	-4	.	-12	18	19
21	-13	7	33	5	-5	11	5	.	.	-7	21	12
22	-7	14	33	-3	-1	9	1	-14	3	2	13	.
23	-4	23	25	-12	6	2	-10	-12	7	.	17	1
24	4	26	19	-10	12	5	-10	-12	12	15	9	-1
25	13	27	18	-6	14	-5	-14	-7	13	13	6	4
26	28	30	16	.	20	0	-16	-6	11	13	9	-10
27	26	24	11	.	8	-6	-16	0	9	10	7	-10
28	27	13	6	.	9	-5	-10	6	5	8	2	-10
29	23	20	6	.	9	-12	-5	8		4	-10	-4
30	25	15	8	4	4	-8	.	7		7	-11	3
31		12	1		-4		11	7		6		6

"." indicates no data available for that day.

APRIL 1977 DATA

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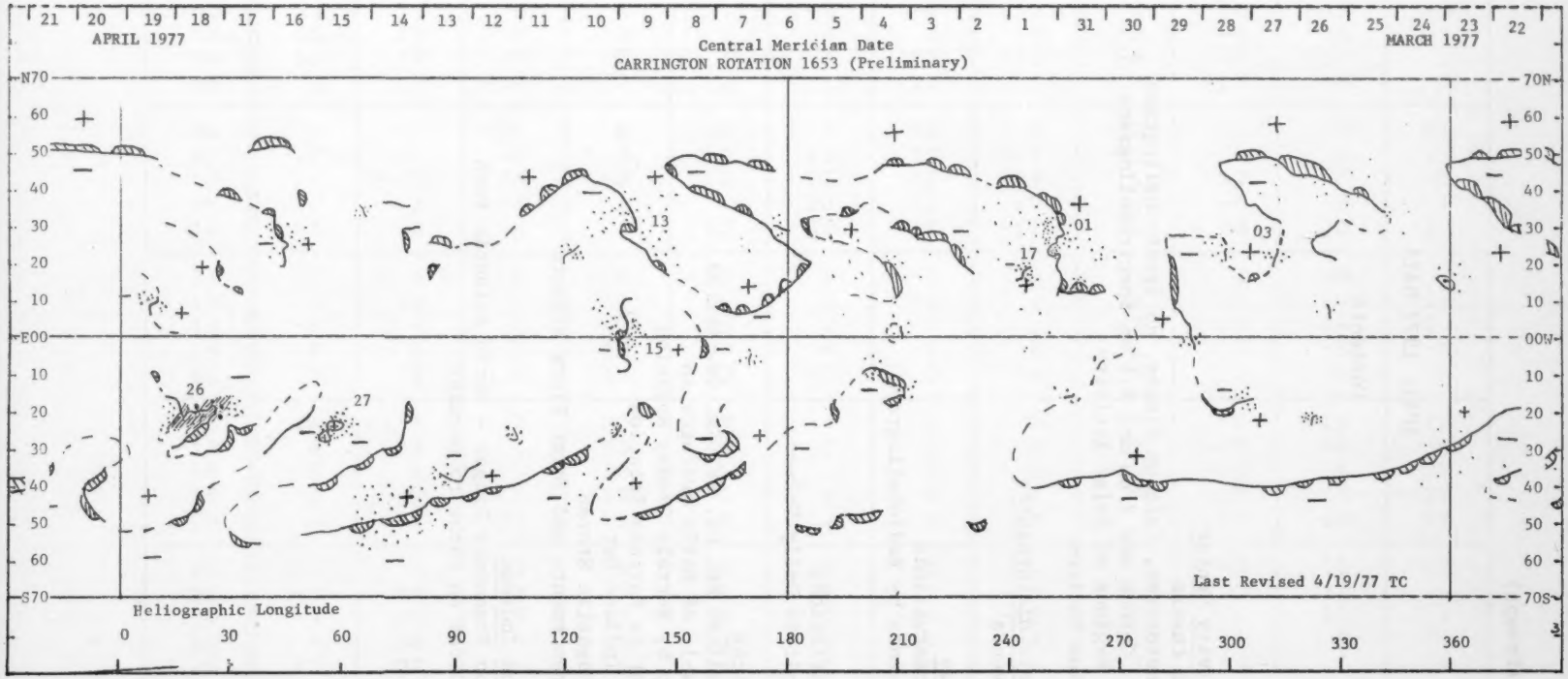
Quality Indices on Paths to Germany	120

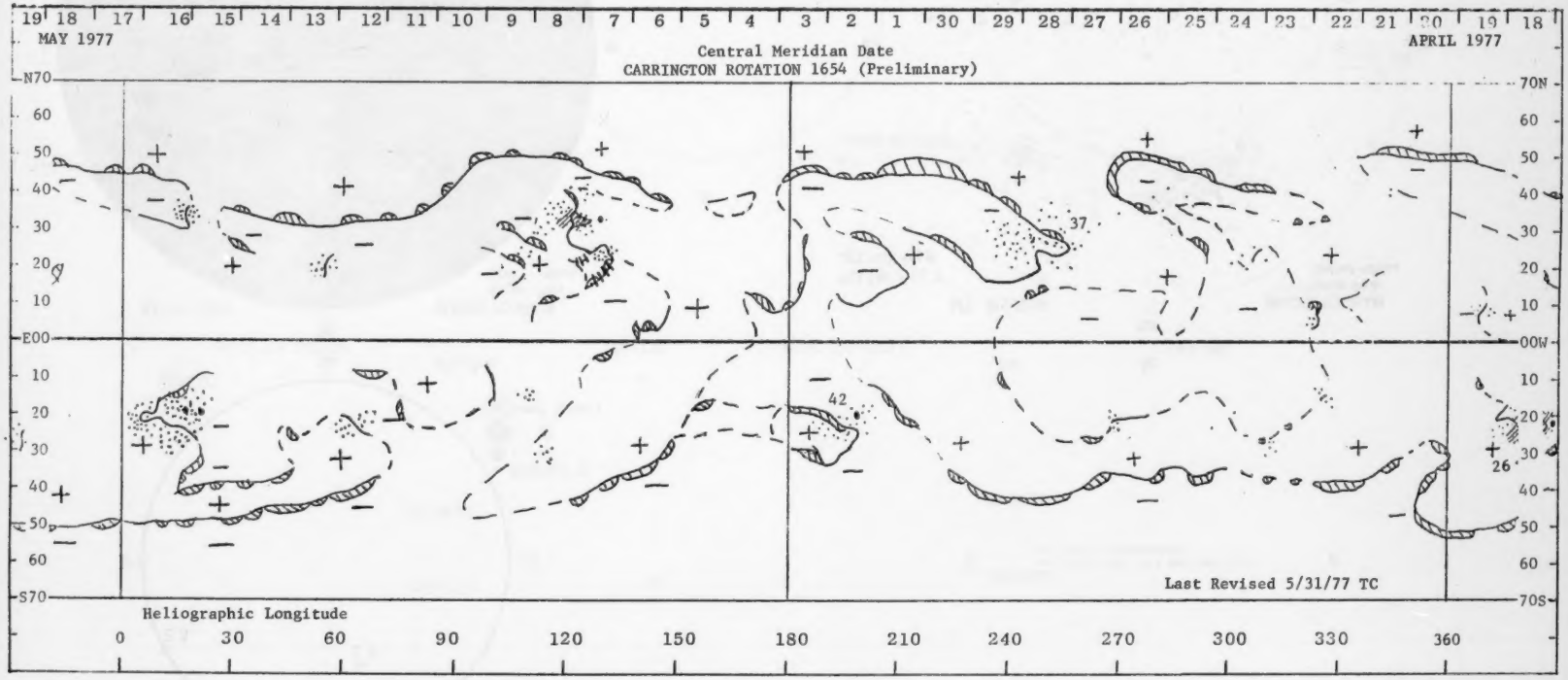
Hα SYNOPTIC CHART

CARRINGTON ROTATION 1653 (PRELIMINARY)



Hα SYNOPTIC CHART

CARRINGTON ROTATION 1654 (PRELIMINARY)

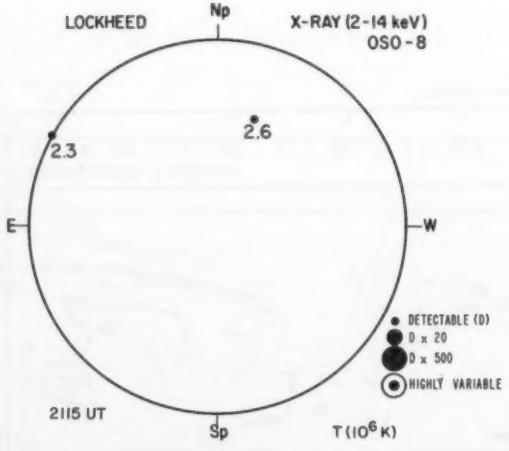


31 Apr 77

APRIL 1, 1977 (P =26.20, B_o =-6.53, L_o =252.33)

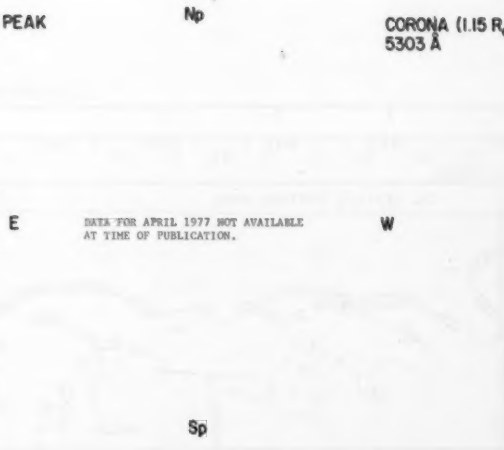
LOCKHEED

X-RAY (2-14 keV)
OSO-8



SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å



DATA FOR APRIL 1977 NOT AVAILABLE AT TIME OF PUBLICATION.

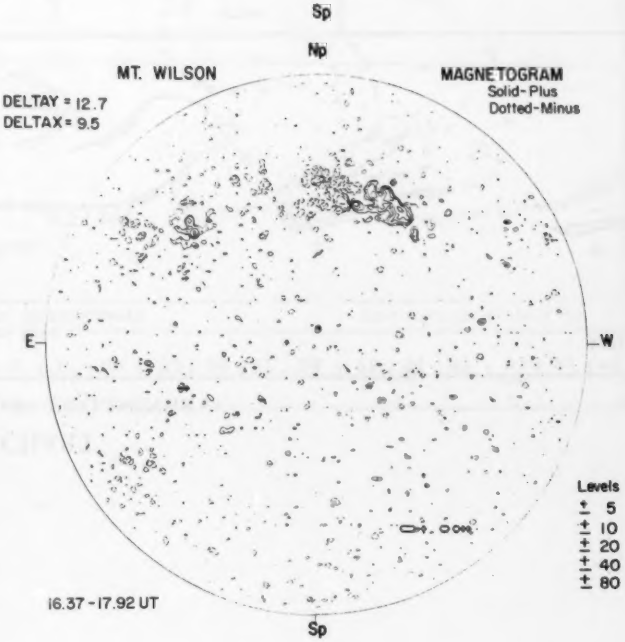
KITT PEAK

MAGNETOGRAM
Bright- Plus
Dark - Minus

MT. WILSON

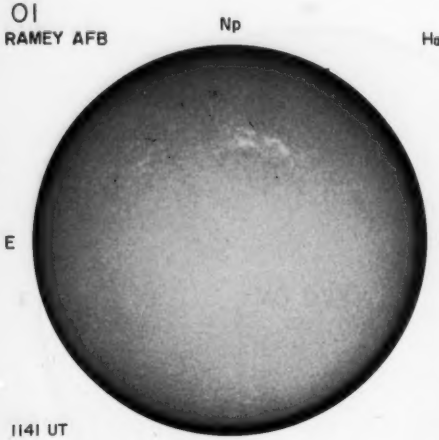
DELTAY = 12.7
DELTAX = 9.5

MAGNETOGRAM
Solid- Plus
Dotted-Minus



01

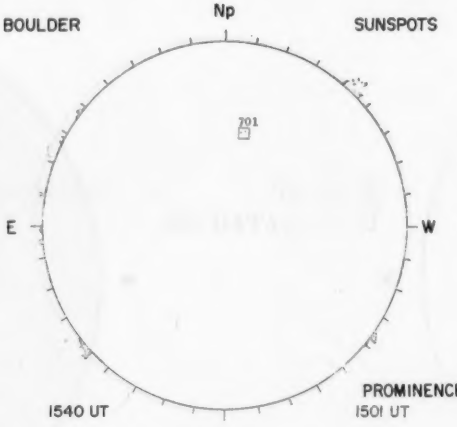
RAMEY AFB



1141 UT

Hα

BOULDER



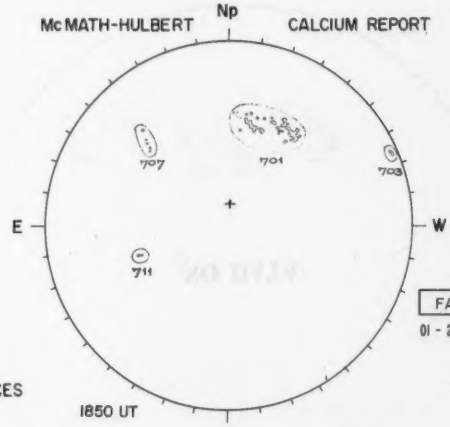
1540 UT

SUNSPOTS

PROMINENCES

1501 UT

McMATH-HULBERT



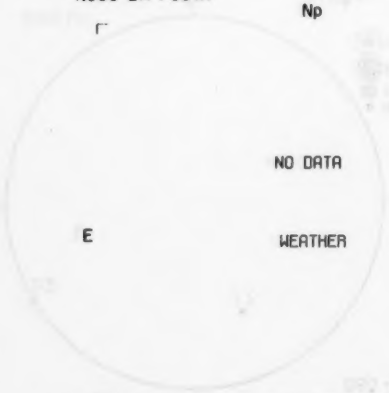
1850 UT

CALCIUM REPORT

FAIR | M

01 - 2000-3.0

NOSC LA POSTA



2.0 CM

----UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

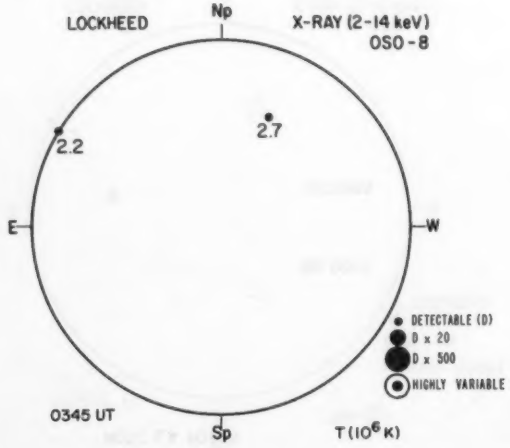
----UT.

Ant. Temp. Unit 100°K

APRIL 2, 1977 (P =-26.24, B_o =-6.47, L_o =239.14)

LOCKHEED

X-RAY (2-14 keV)
OSO-8



0345 UT

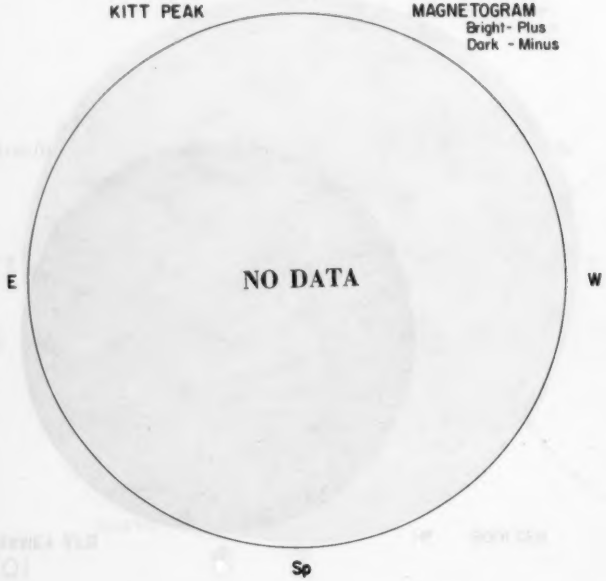
T(10^6 K)

SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å

KITT PEAK

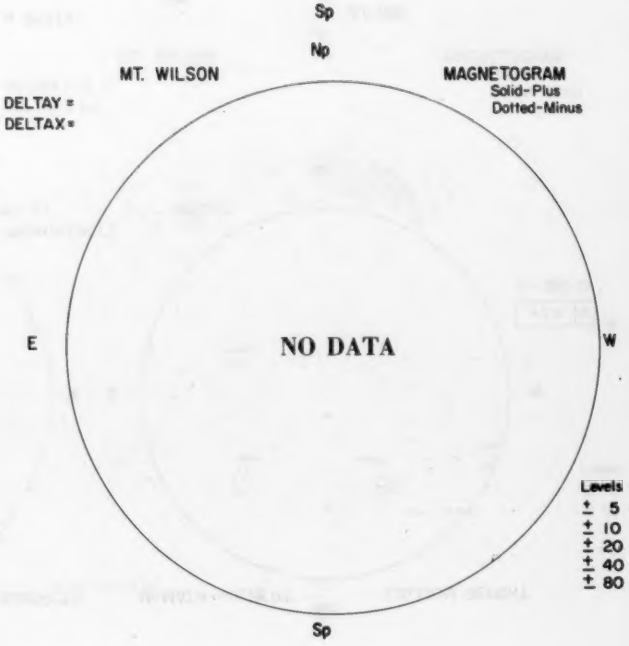
MAGNETOGRAM
Bright - Plus
Dark - Minus



MT. WILSON

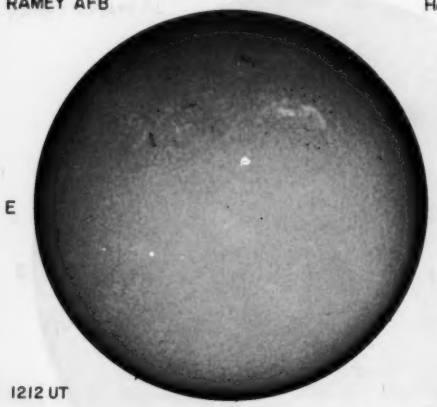
DELTAY =
DELTAX =

MAGNETOGRAM
Solid - Plus
Dotted - Minus



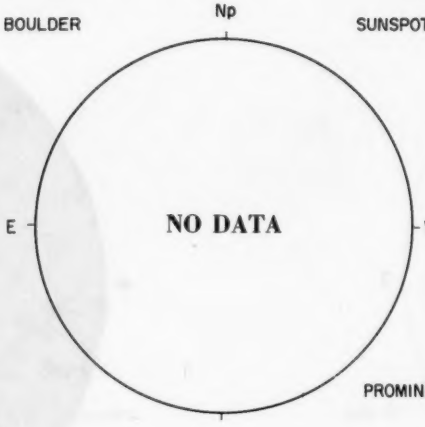
02

RAMEY AFB



1212 UT

Hα BOULDER

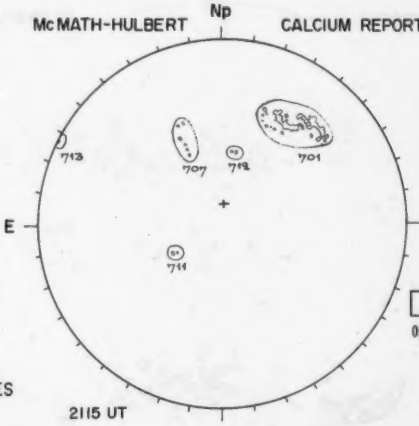


SUNSPOTS

PROMINENCES

McMATH-HULBERT

CALCIUM REPORT



FAIR M

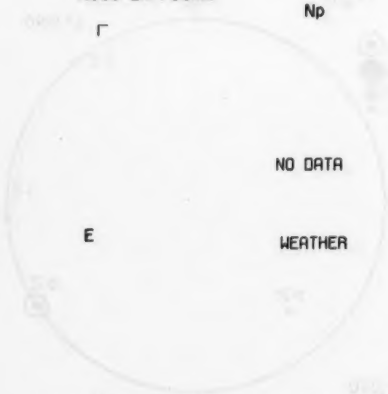
01 - 2100 - 3.0

2115 UT

NOSC LA POSTA

Np

2.0 CM



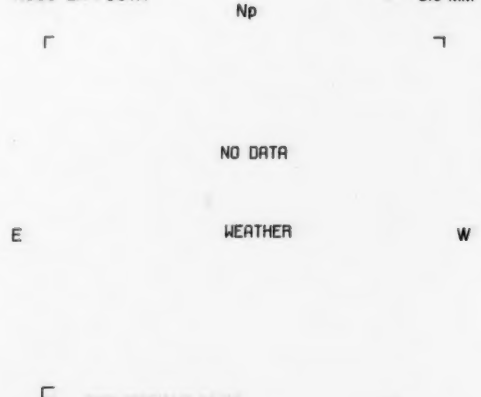
----UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

Np

8.6 MM

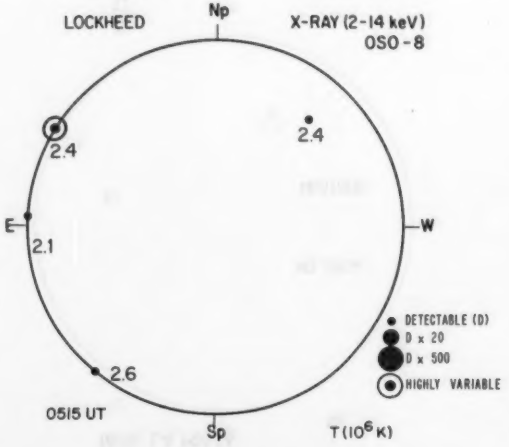


----UT

Ant. Temp. Unit 100°K

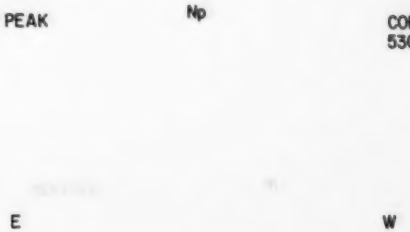
APRIL 3, 1977 (P =-26.27, B_o =-6.42, L_o =225.94)

LOCKHEED X-RAY (2-14 keV) OSO-8

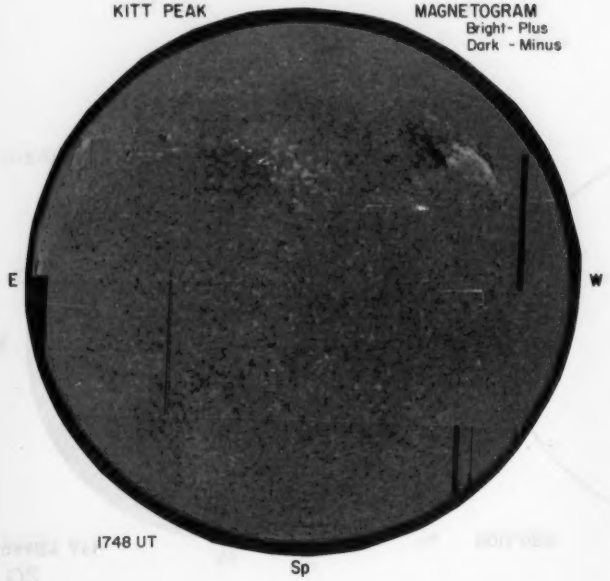


0515 UT T(10^6 K)

SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å



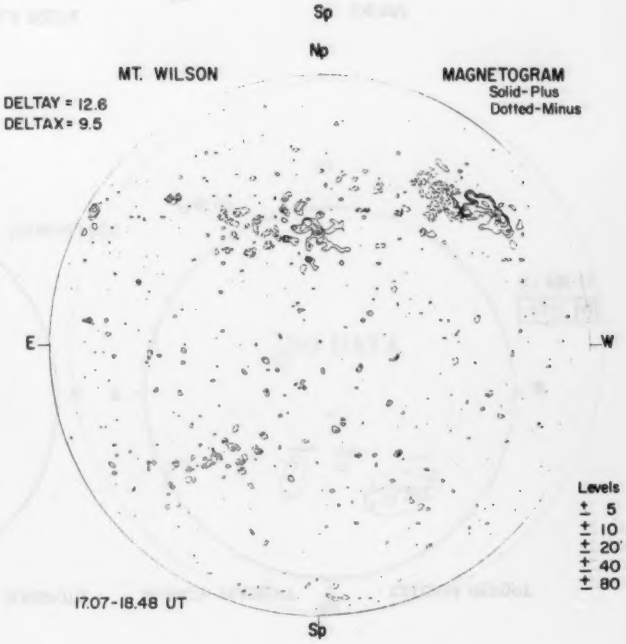
KITT PEAK MAGNETOGRAM Bright-Plus Dark-Minus



1748 UT

MT. WILSON MAGNETOGRAM Solid-Plus Dotted-Minus

DELTAY = 12.6
DELTAX = 9.5



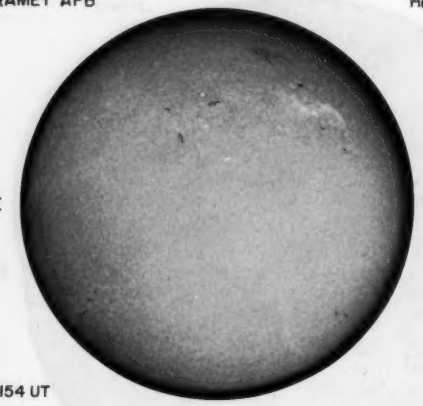
17.07-18.48 UT

03

RAMEY AFB

Np

Hα



E

W

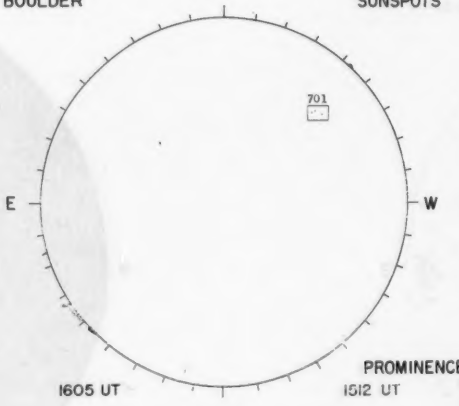
1154 UT

Sp

BOULDER

Np

SUNSPOTS



E

W

1605 UT

Sp

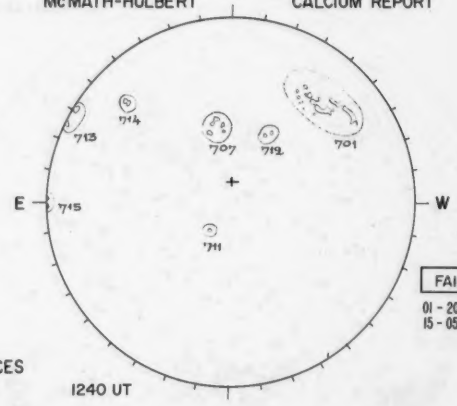
PROMINENCES

1512 UT

McMATH-HULBERT

Np

CALCIUM REPORT



E

W

1240 UT

Sp

FAIR | D

01 - 2000-3.0

15 - 0500-2.5

NOSC LA POSTA

Np

2.0 CM

NO DATA

E

EQUIPMENT

W

Sp

----UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

Np

8.6 MM

NO DATA

E

EQUIPMENT

W

Sp

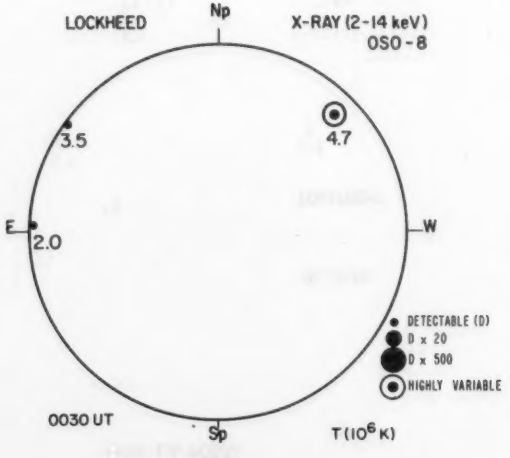
---- UT

Ant. Temp. Unit 100°K

APRIL 4, 1977 (P =-26.30, B_o =-6.36, L_o =212.75)

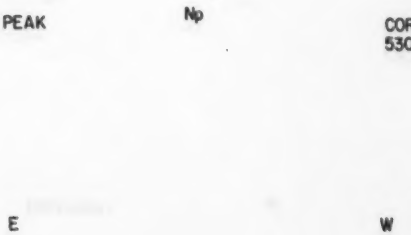
LOCKHEED

X-RAY (2-14 keV)
OSO-8



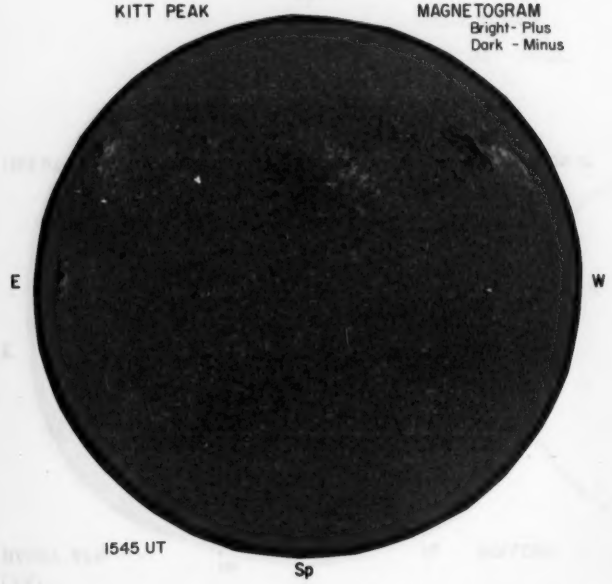
SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å



KITT PEAK

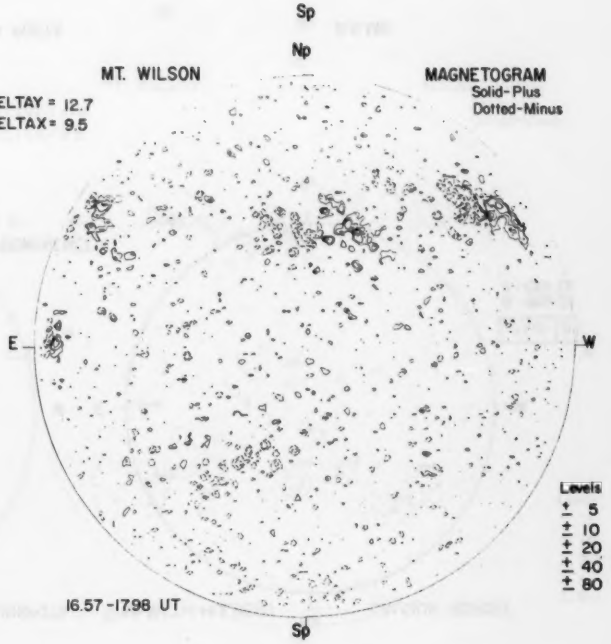
MAGNETOGRAM
Bright - Plus
Dark - Minus



MT. WILSON

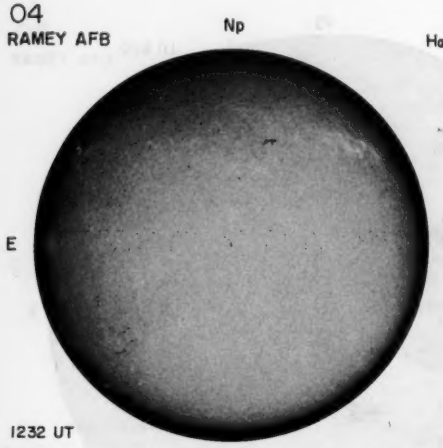
DELTAY = 12.7
DELTAX = 9.5

MAGNETOGRAM
Solid - Plus
Dotted - Minus



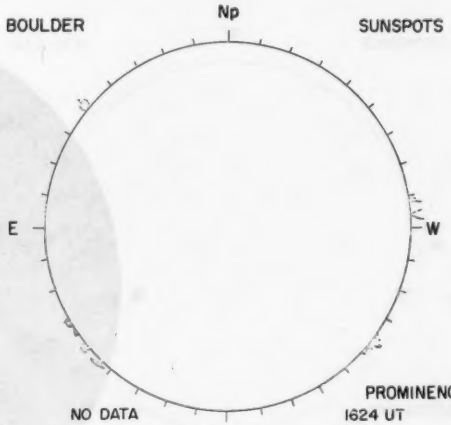
04

RAMEY AFB



1232 UT

BOULDER



SUNSPOTS

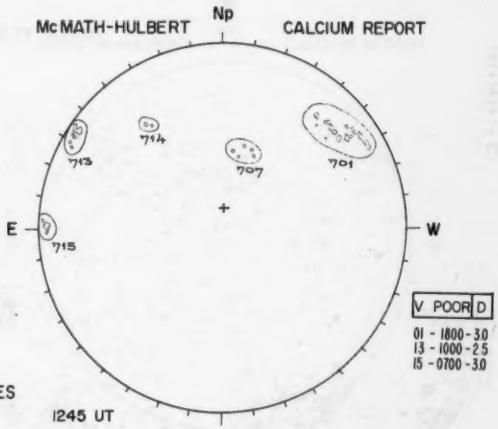
NO DATA

PROMINENCES

1624 UT

McMATH-HULBERT

CALCIUM REPORT



1245 UT

V POOR D

01 - 1800-3.0
13 - 1000-2.5
15 - 0700-3.0

NOSC LA POSTA

Np

2.0 CM

NO DATA

E

EQUIPMENT

W

Sp

----UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

Np

8.6 MM

NO DATA

E

EQUIPMENT

W

Sp

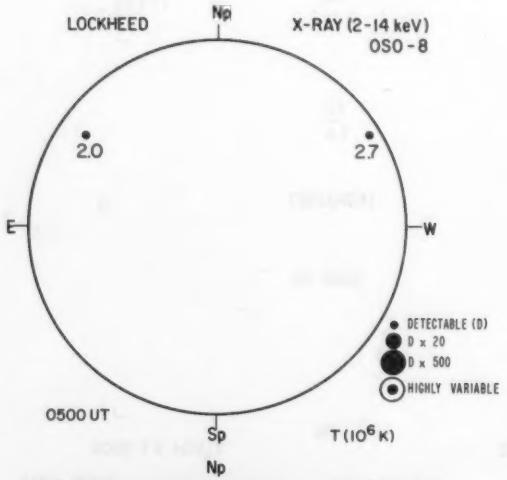
----UT

Ant. Temp. Unit 100°K

APRIL 5, 1977 (P = -26.32, B_o = -6.30, L_o = 199.55)

LOCKHEED

X-RAY (2-14 keV)
OSO-8

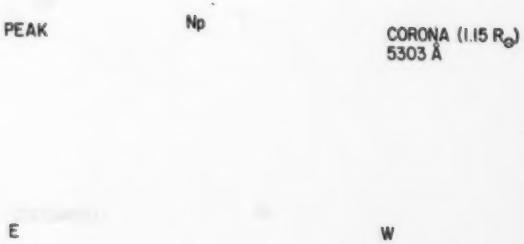


0500 UT

T (10^6 K)

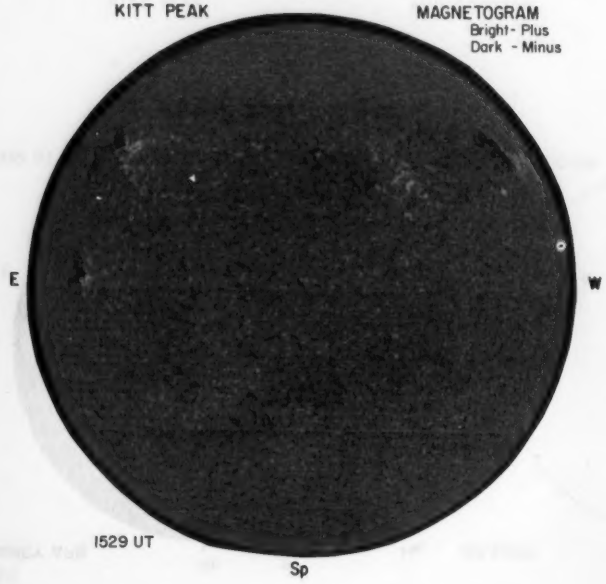
SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å



KITT PEAK

MAGNETOGRAM
Bright - Plus
Dark - Minus

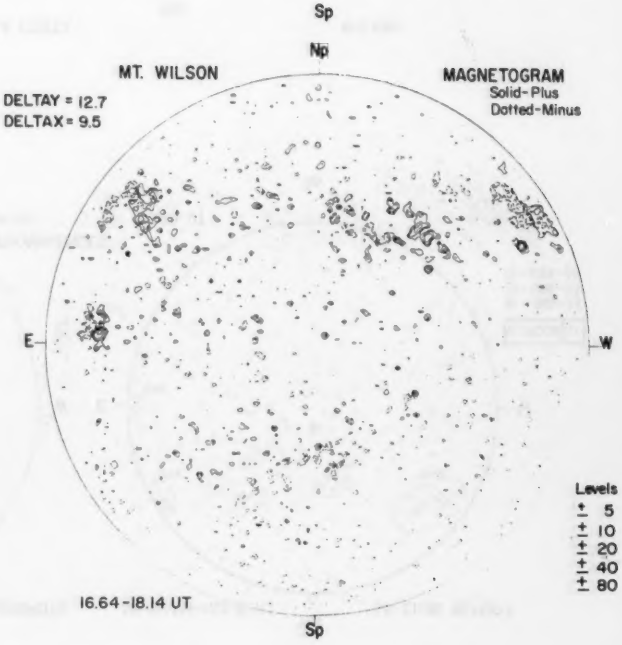


1529 UT

MT. WILSON

DELTAY = 12.7
DELTAX = 9.5

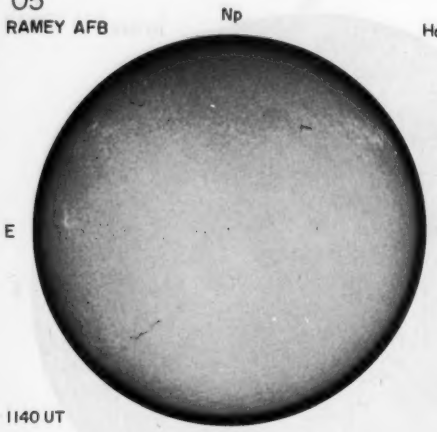
MAGNETOGRAM
Solid - Plus
Dotted - Minus



16.64 - 18.14 UT

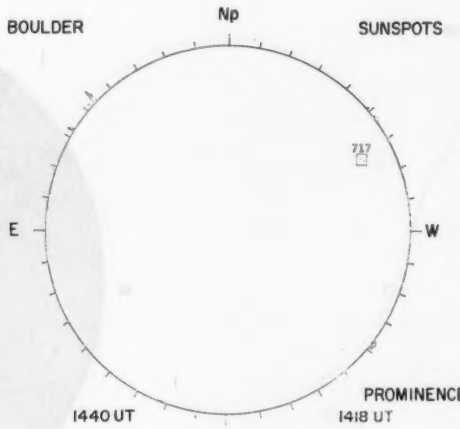
05

RAMEY AFB



1140 UT

Hα BOULDER

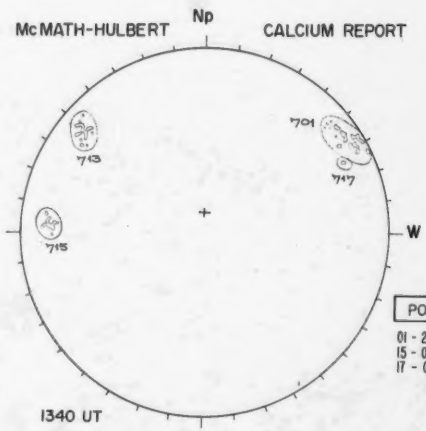


1440 UT

SUNSPOTS

1418 UT

McMATH-HULBERT



1340 UT

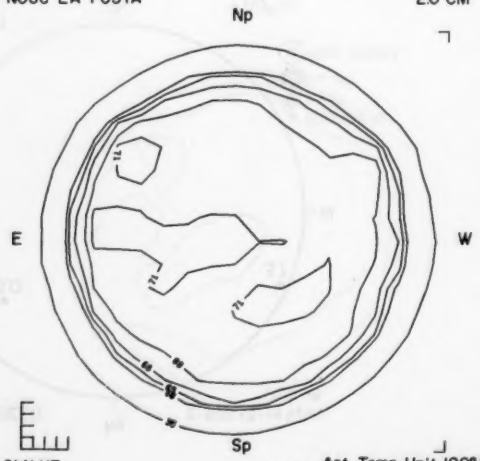
CALCIUM REPORT

POOR	S

01 - 2000-2.5
15 - 0700-2.5
17 - 0100-3.0

PROMINENCES

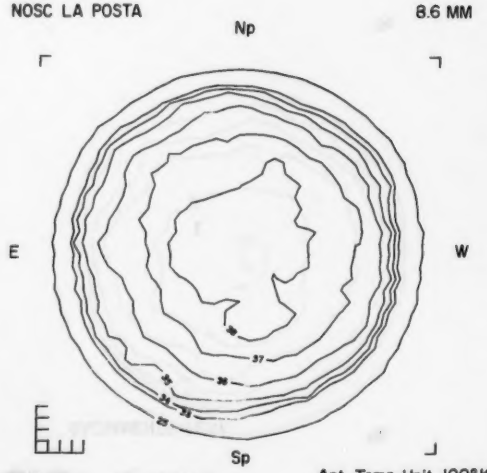
NOSC LA POSTA 2.0 CM



2141 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM



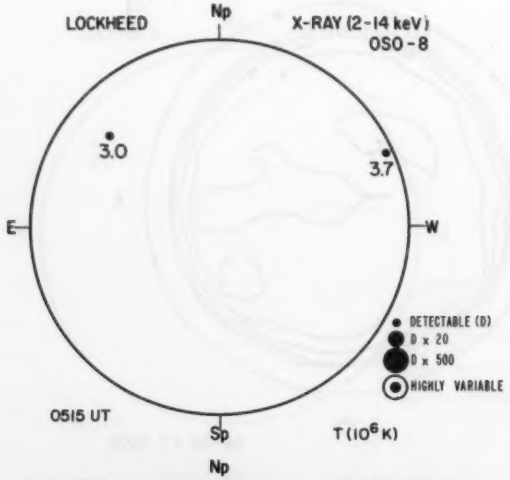
2213 UT

Ant. Temp. Unit 100°K

APRIL 6, 1977 (P =-26.33, B_o =-6.23, L_o =186.36)

LOCKHEED

X-RAY (2-14 keV)
OSO-8



0515 UT

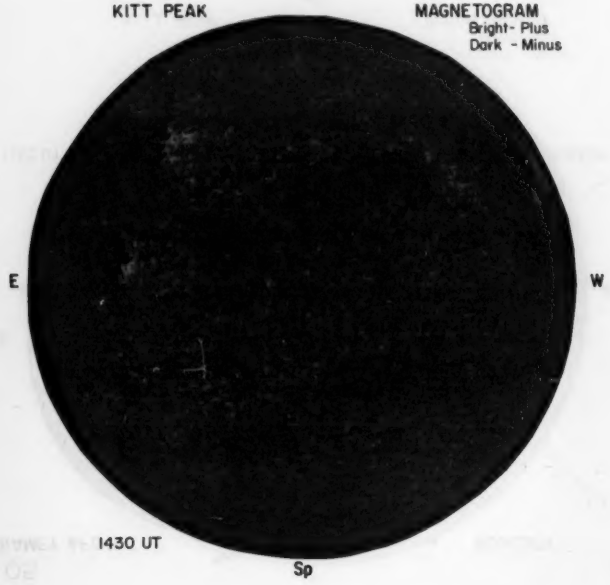
T (10^6 K)

SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å

KITT PEAK

MAGNETOGRAM
Bright - Plus
Dark - Minus

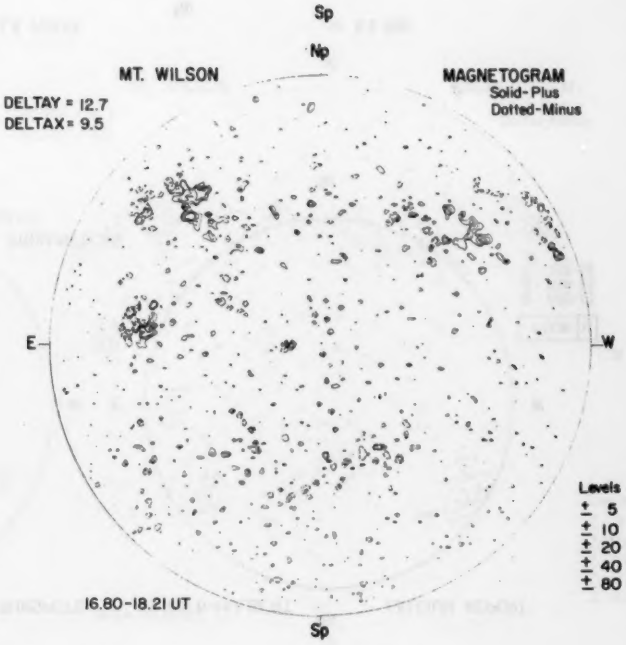


1430 UT

MT. WILSON

DELTAY = 12.7
DELTAX = 9.5

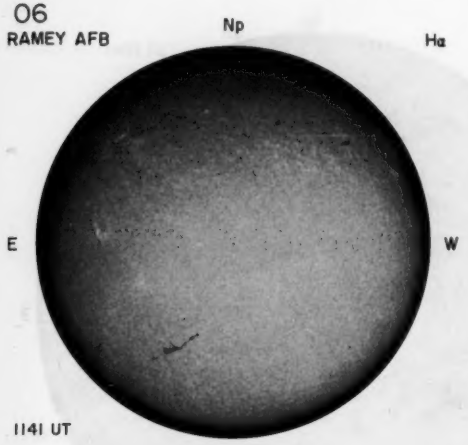
MAGNETOGRAM
Solid - Plus
Dotted - Minus



16.80-18.21 UT

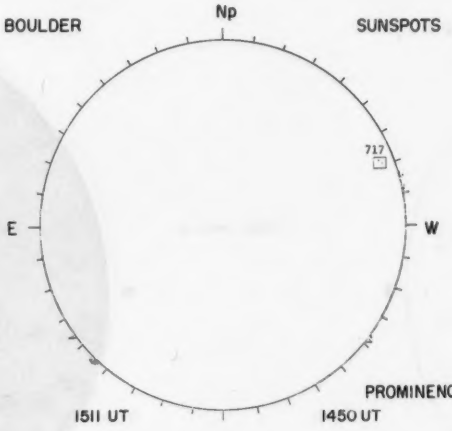
06

RAMEY AFB



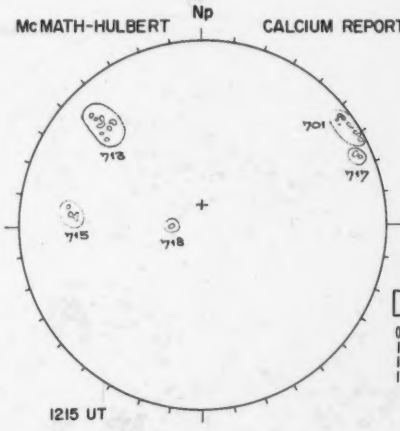
1141 UT

Hα BOULDER



1511 UT

SUNSPOTS



1450 UT

McMATH-HULBERT

1215 UT

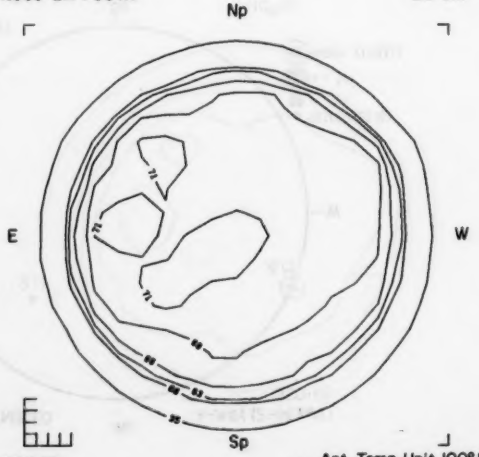
CALCIUM REPORT

POOR | D

01 - 1500 - 2.5
13 - 0800 - 2.5
15 - 0500 - 2.5
17 - 0400 - 3.0

PROMINENCES

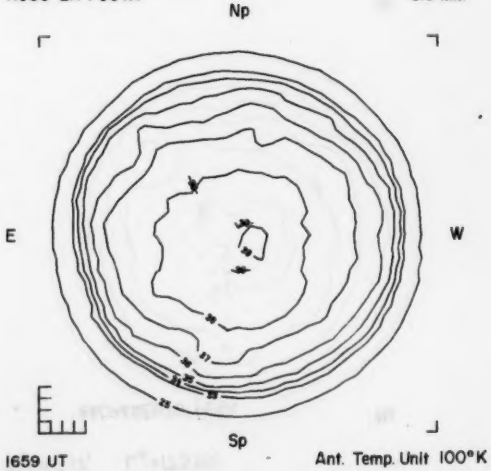
NOSC LA POSTA 2.0 CM



1622 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM



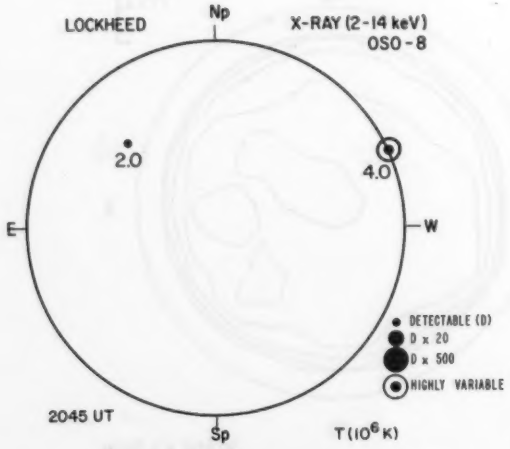
1659 UT

Ant. Temp. Unit 100°K

APRIL 7, 1977 (P =-26.33, B_0 =-6.17, L_0 =173.16)

LOCKHEED

X-RAY (2-14 keV)
OSO-8

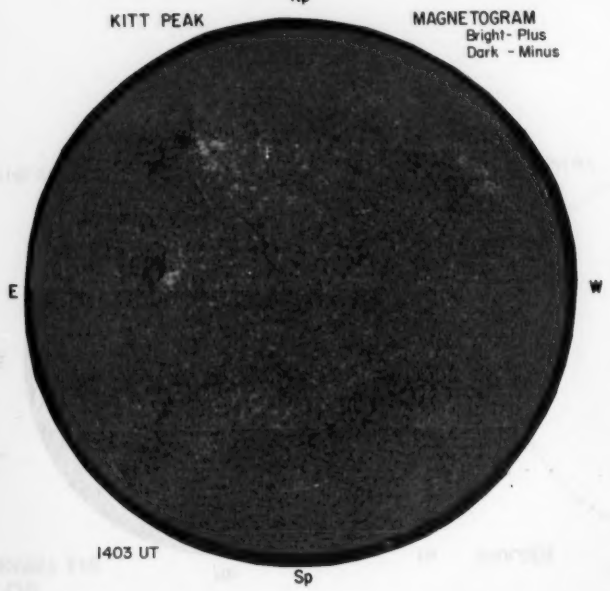


SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å

KITT PEAK

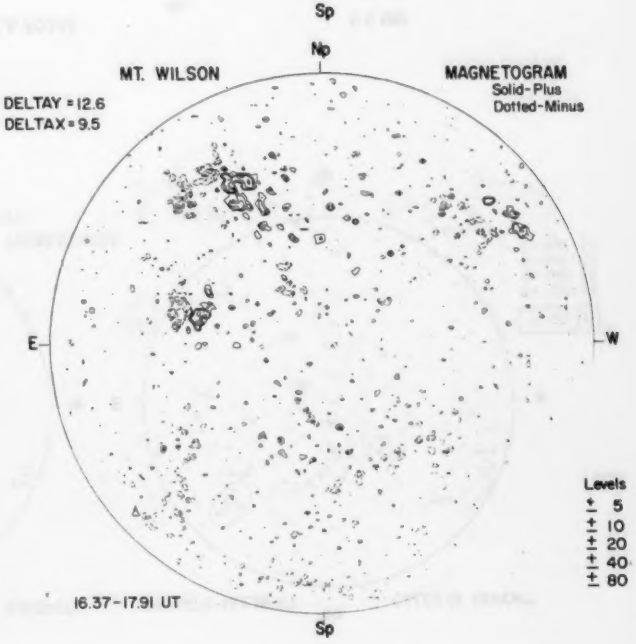
MAGNETOGRAM
Bright - Plus
Dark - Minus



MT. WILSON

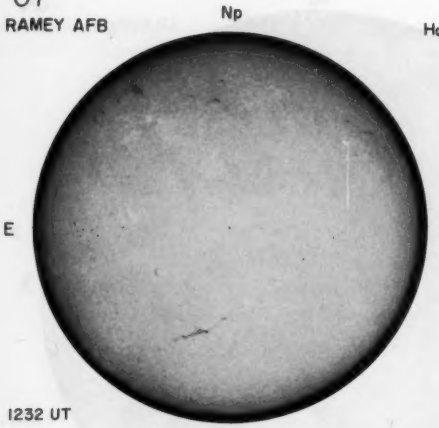
DELTAY = 12.6
DELTAX = 9.5

MAGNETOGRAM
Solid - Plus
Dotted - Minus



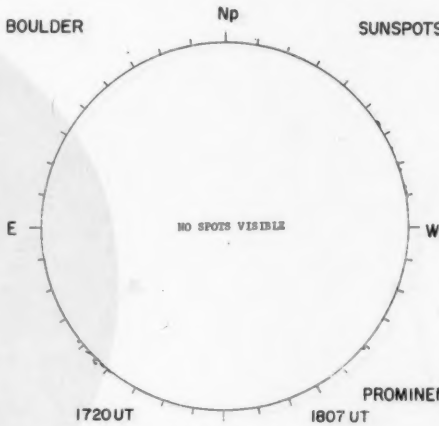
07

RAMEY AFB



1232 UT

Hα BOULDER

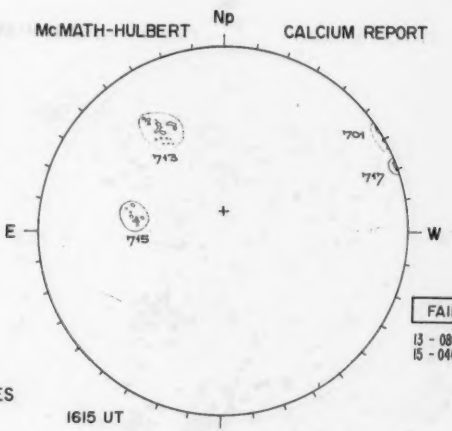


1720 UT

SUNSPOTS

1807 UT

McMATH-HULBERT



1615 UT

CALCIUM REPORT

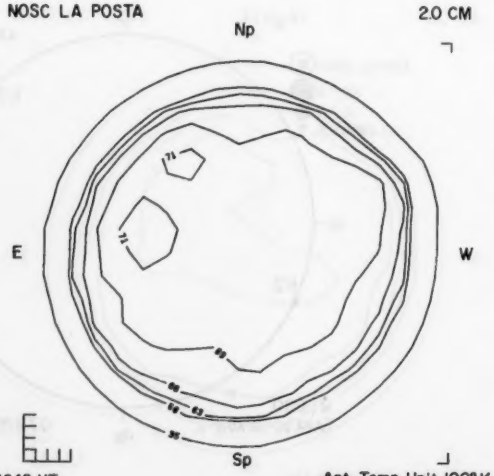
FAIR D

13 - 0800 - 2.5

15 - 0400 - 2.5

PROMINENCES

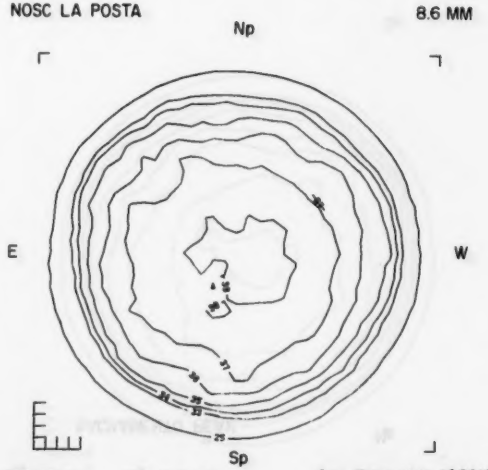
NOSC LA POSTA 2.0 CM



1642 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM



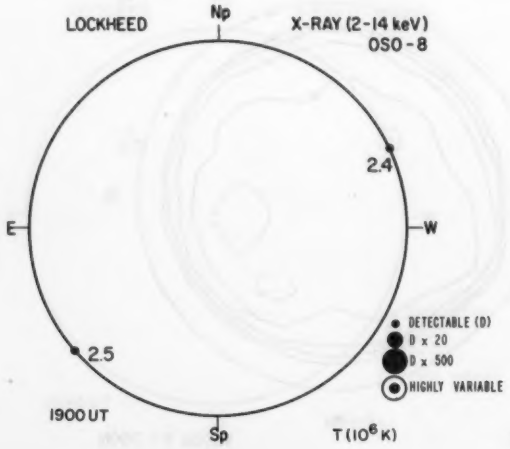
1715 UT

Ant. Temp. Unit 100°K

APRIL 8, 1977 (P =-26.32, B_o =-6.10, L_o =159.96)

LOCKHEED

X-RAY (2-14 keV)
OSO-8



1900 UT

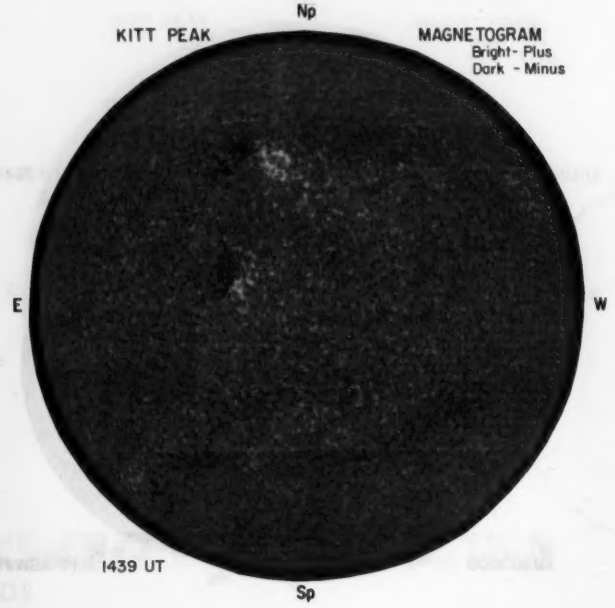
T (10^6 K)

SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å

KITT PEAK

MAGNETOGRAM
Bright - Plus
Dark - Minus

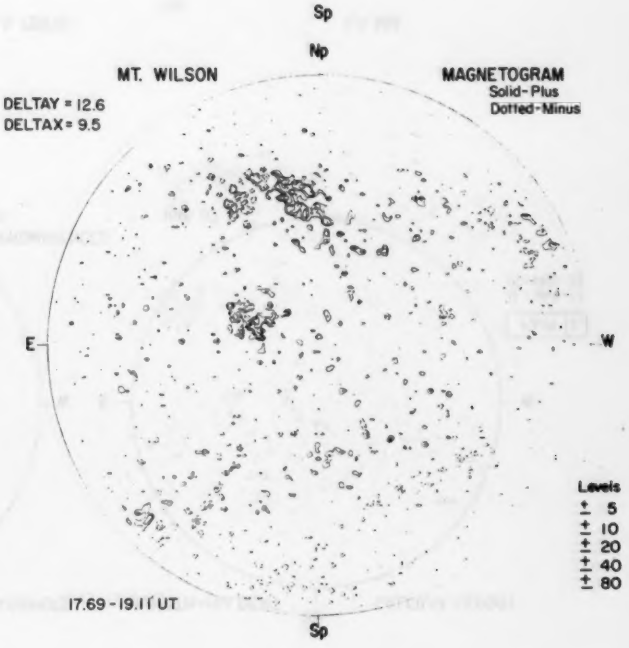


1439 UT

MT. WILSON

DELTAY = 12.6
DELTAX = 9.5

MAGNETOGRAM
Solid - Plus
Dotted - Minus



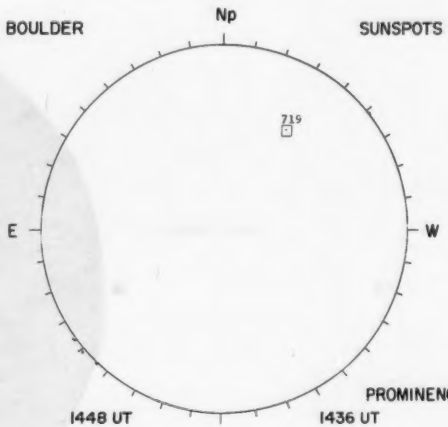
17.69 - 19.11 UT

08

RAMEY AFB

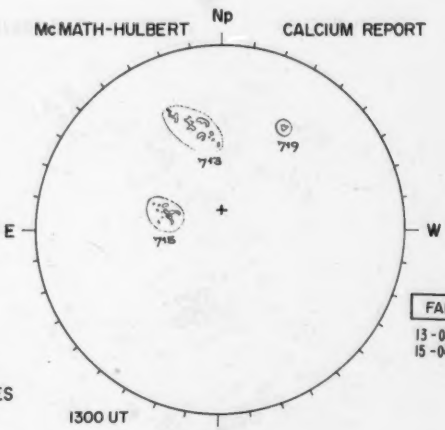
1251 UT

Hα BOULDER



1448 UT

SUNSPOTS



1436 UT

McMATH-HULBERT

1300 UT

CALCIUM REPORT

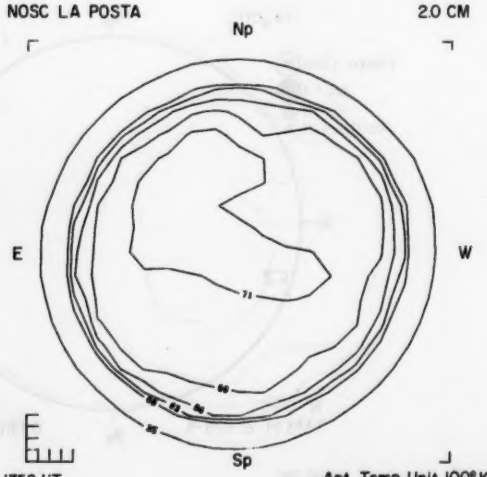
FAIR | S

13 - 0800 - 2.5

15 - 0400 - 2.5

PROMINENCES

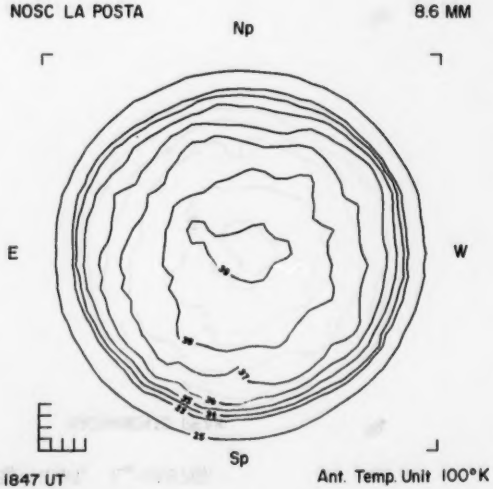
NOSC LA POSTA 2.0 CM



1758 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM



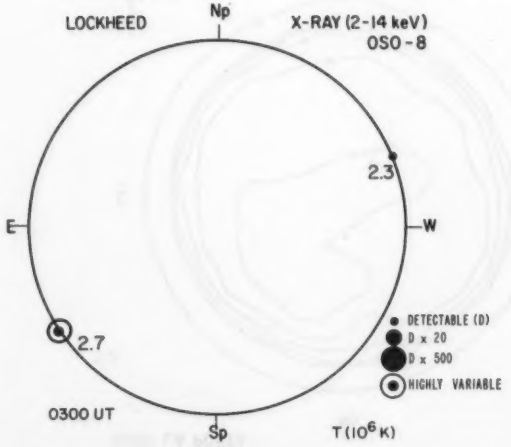
1847 UT

Ant. Temp. Unit 100°K

APRIL 9, 1977 (P =-26.31, B_o =-6.04, L_o =146.76)

LOCKHEED

X-RAY (2-14 keV)
OSO-8



0300 UT

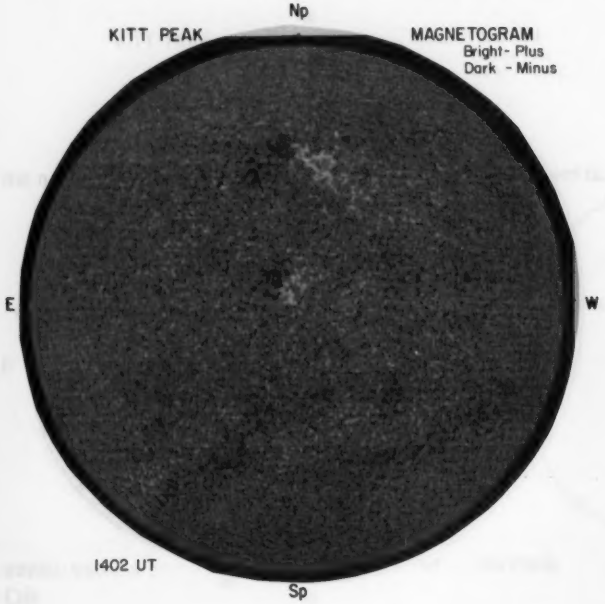
T(10^6 K)

SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å

KITT PEAK

MAGNETOGRAM
Bright - Plus
Dark - Minus

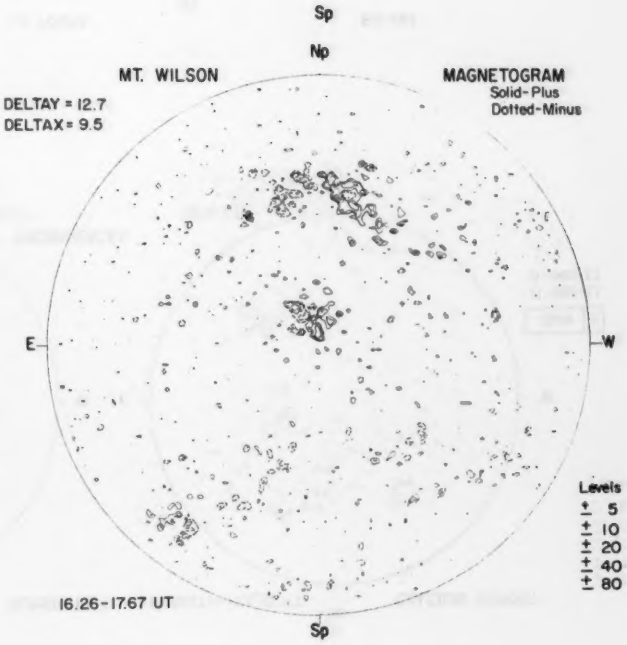


1402 UT

MT. WILSON

DELTAY = 12.7
DELTAX = 9.5

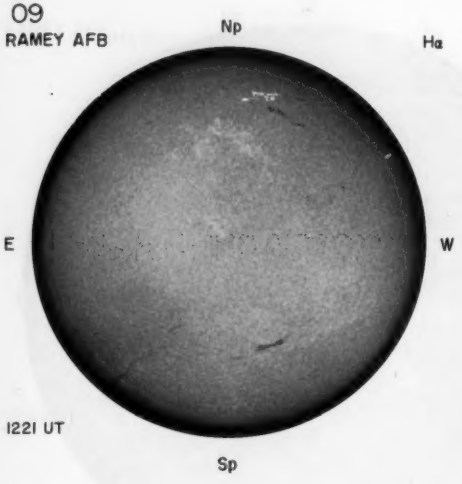
MAGNETOGRAM
Solid - Plus
Dotted - Minus



16.26-17.67 UT

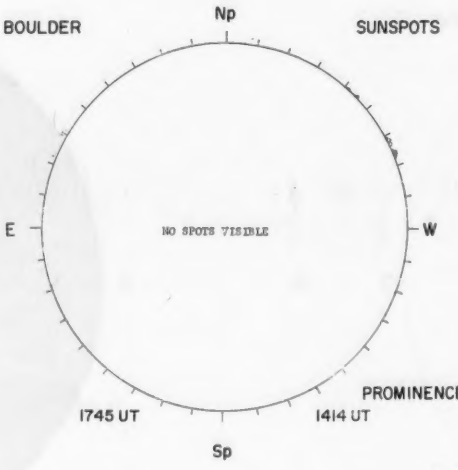
09

RAMEY AFB



1221 UT

Hα BOULDER



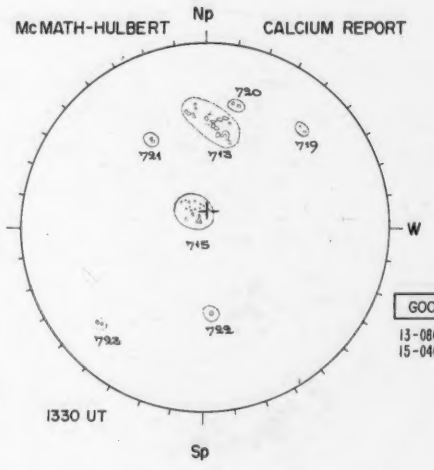
1745 UT

SUNSPOTS

1414 UT

PROMINENCES

McMATH-HULBERT



1330 UT

CALCIUM REPORT

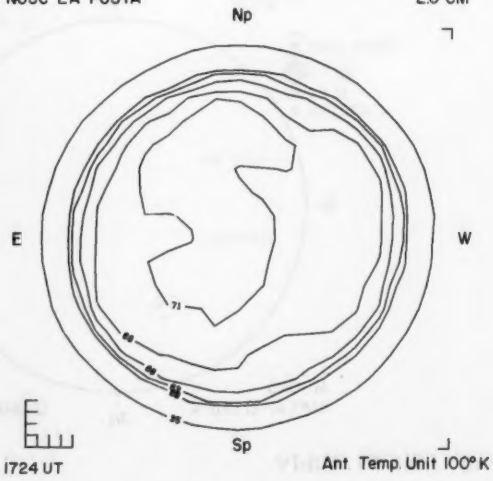
GOOD | M

13-0800-2.5

15-0400-2.5

NOSC LA POSTA

2.0 CM

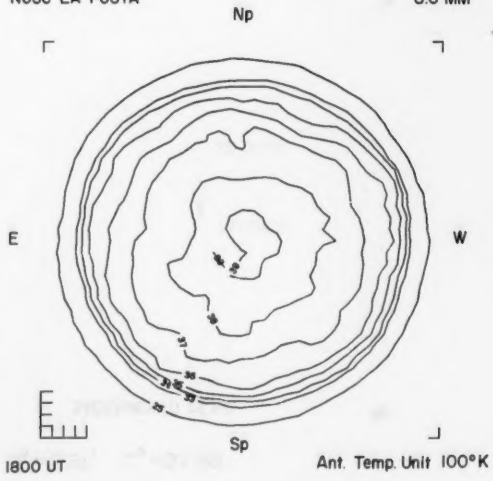


1724 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM



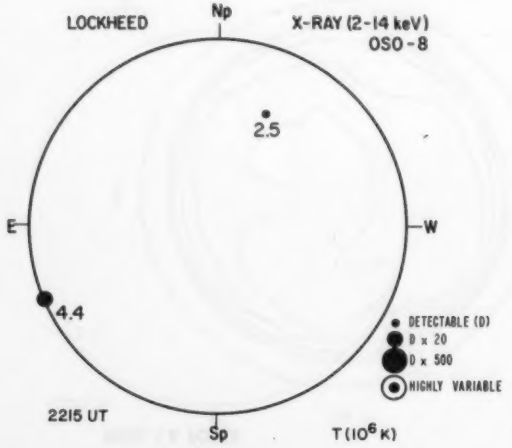
1800 UT

Ant. Temp. Unit 100°K

APRIL 10, 1977 (P =-26.29, B_o =-5.97, L_o =133.56)

LOCKHEED

X-RAY (2-14 keV)
OSO-8

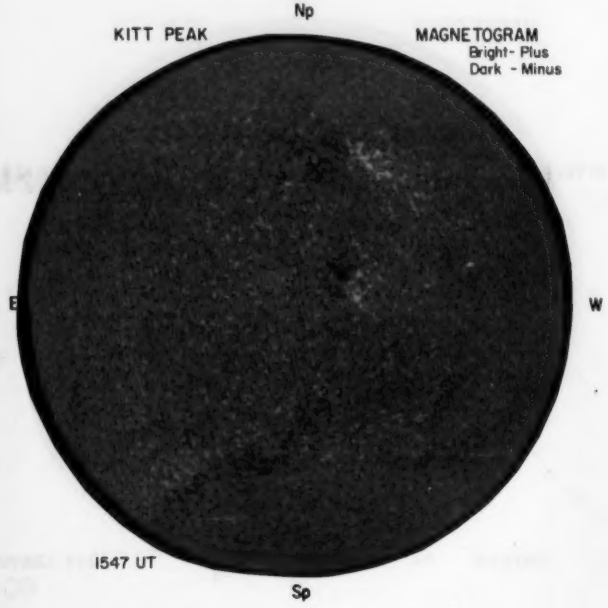


SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å

KITT PEAK

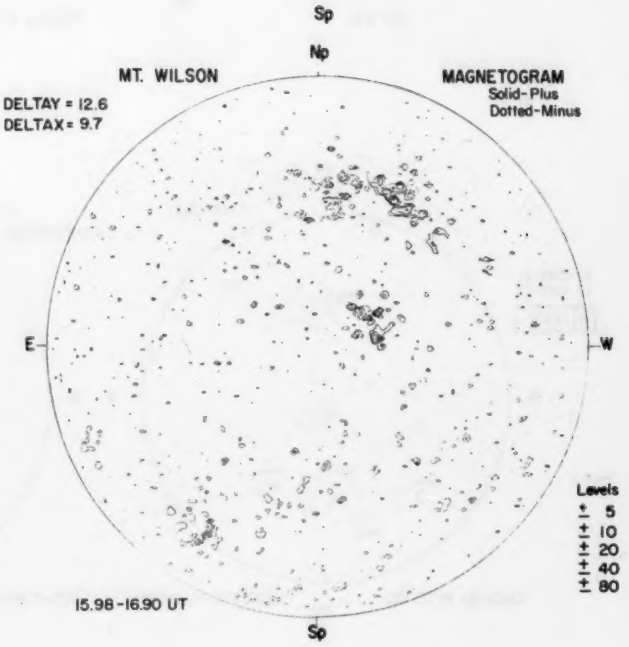
MAGNETOGRAM
Bright- Plus
Dark - Minus



MT. WILSON

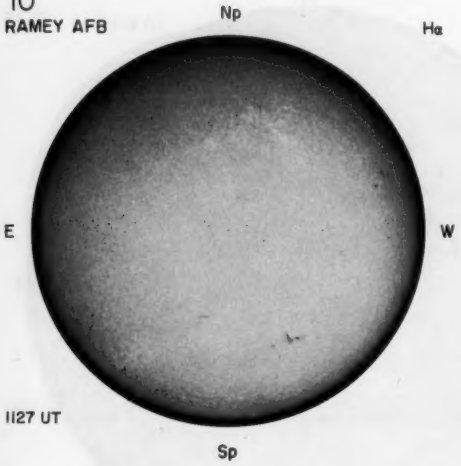
DELTAY = 12.6
DELTAX = 9.7

MAGNETOGRAM
Solid- Plus
Dotted-Minus



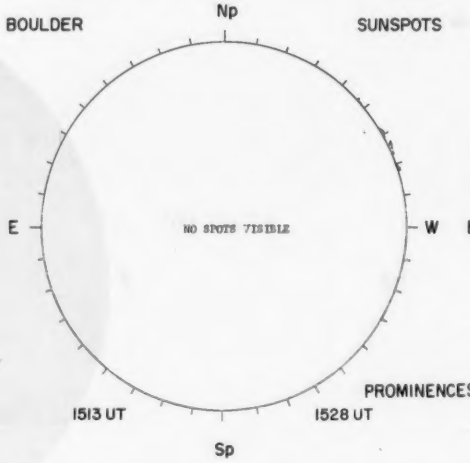
10

RAMEY AFB



1127 UT

Hα BOULDER



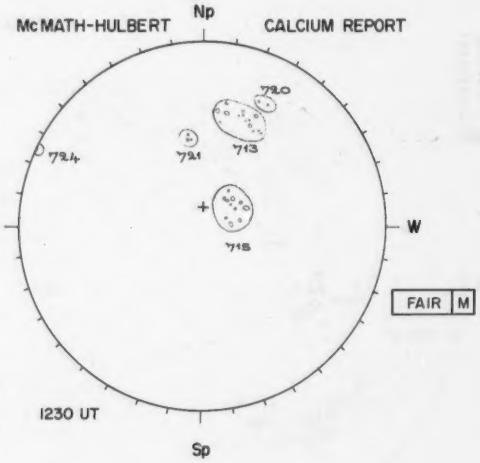
1513 UT

SUNSPOTS

1528 UT

PROMINENCES

McMATH-HULBERT

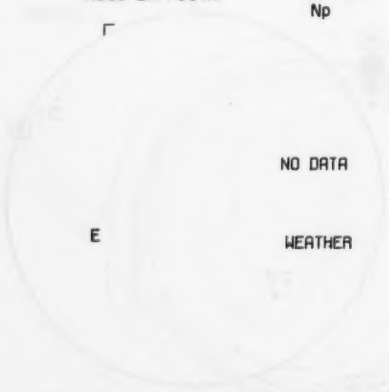


1230 UT

CALCIUM REPORT

FAIR | M

NOSC LA POSTA

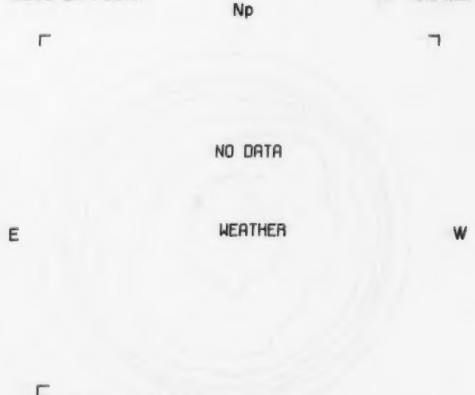


2.0 CM

---- UT

Ant. Temp. Unit 100°K

NOSC LA POSTA



8.6 MM

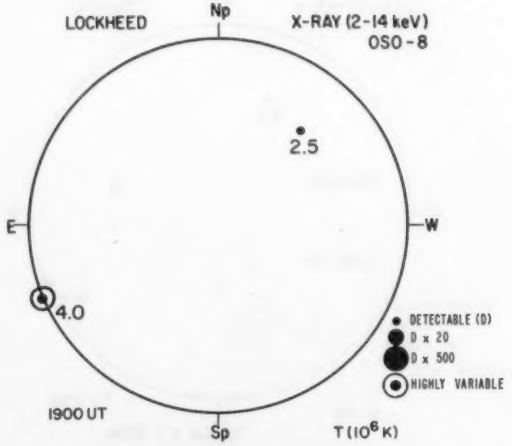
---- UT

Ant. Temp. Unit 100°K

APRIL 11, 1977 (P =-26.27, B_o =-5.89, L_o =120.36)

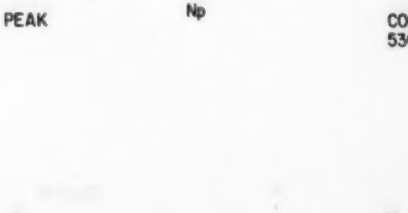
LOCKHEED

X-RAY (2-14 keV)
OSO-8



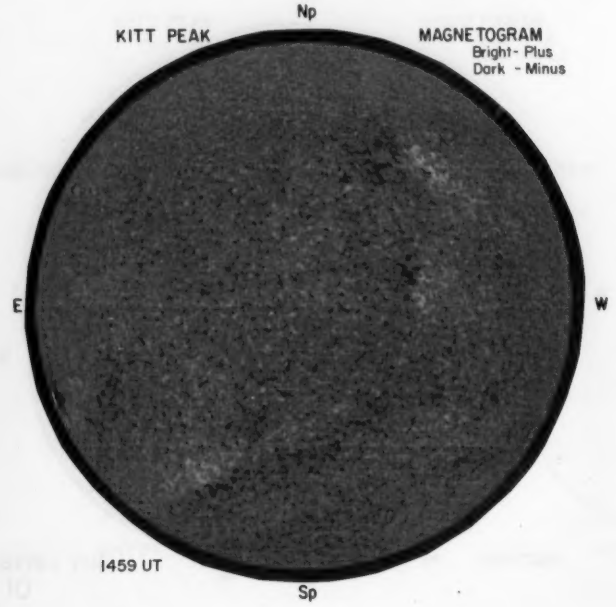
SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å



KITT PEAK

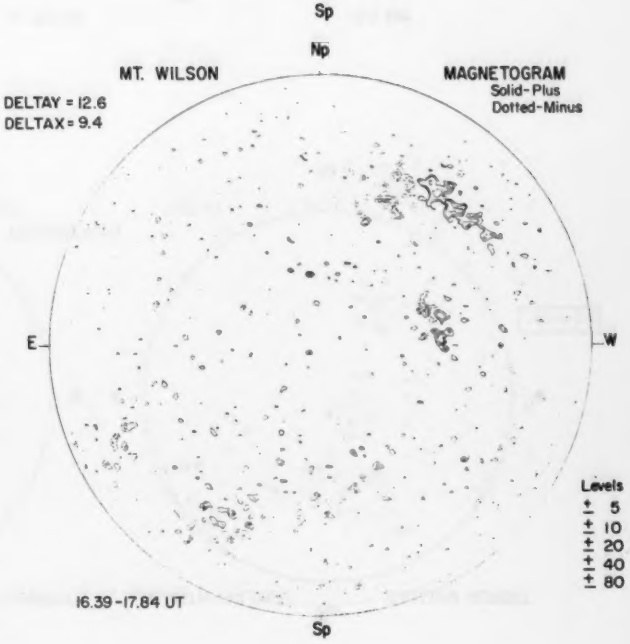
MAGNETOGRAM
Bright - Plus
Dark - Minus



MT. WILSON

MAGNETOGRAM
Solid - Plus
Dotted - Minus

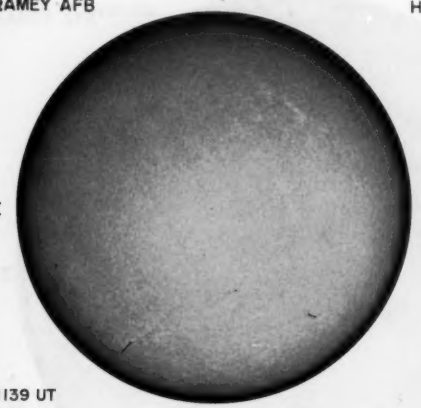
DELTAY = 12.6
DELTAX = 9.4



RAMEY AFB

Np

Hα



E W

Sp

1139 UT

BOULDER

Np

NO DATA

E W

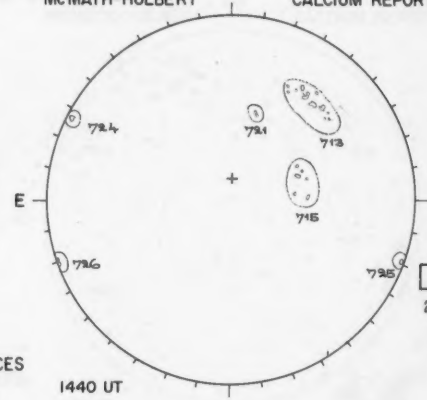
Sp

SUNSPOTS

PROMINENCES

McMATH-HULBERT

Np



E W

Sp

1440 UT

CALCIUM REPORT

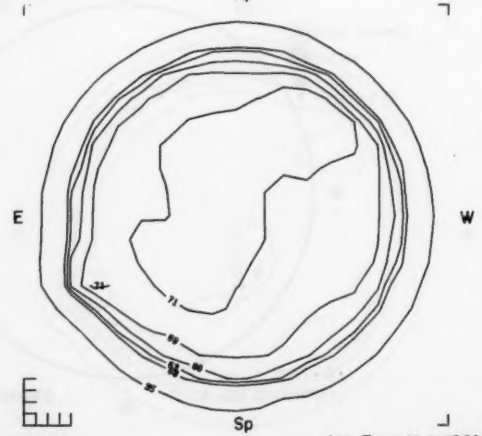
FAIR S

26-0800-3.5

NOSC LA POSTA

2.0 CM

Np



E W

Sp

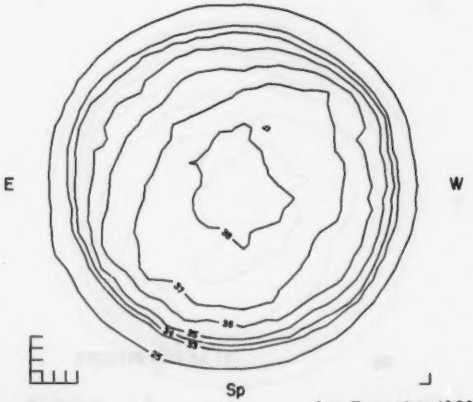
1752 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

Np



E W

Sp

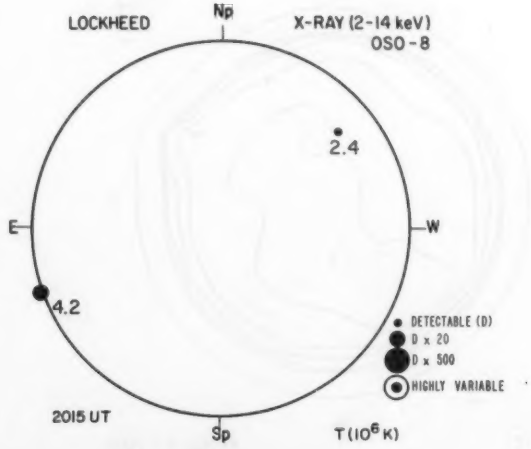
1828 UT

Ant. Temp. Unit 100°K

APRIL 12, 1977 (P =-26.23, B_o =-5.82, L_o =107.16)

LOCKHEED

X-RAY (2-14 keV)
OSO-8

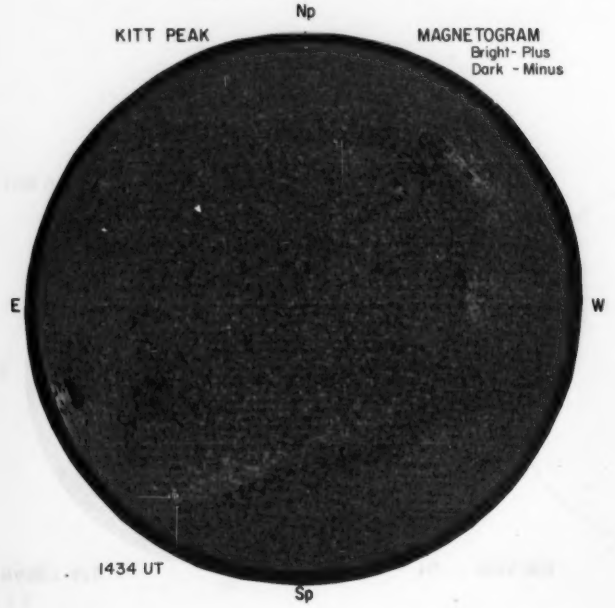


SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å

KITT PEAK

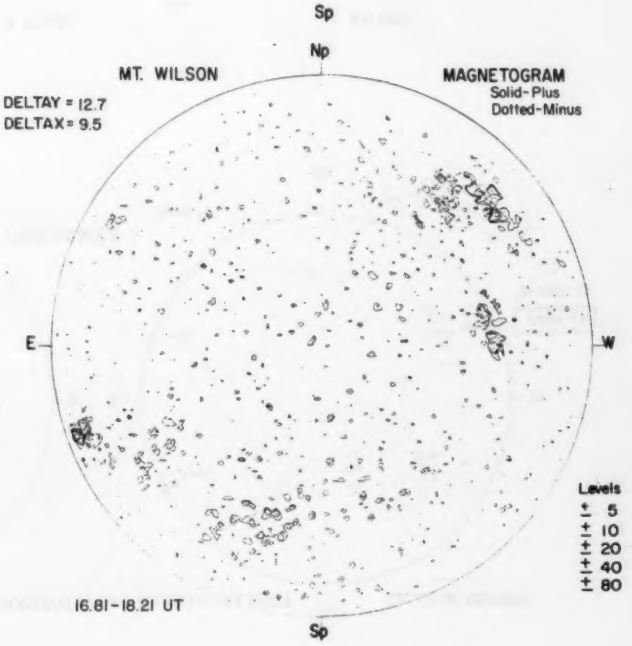
MAGNETOGRAM
Bright - Plus
Dark - Minus



MT. WILSON

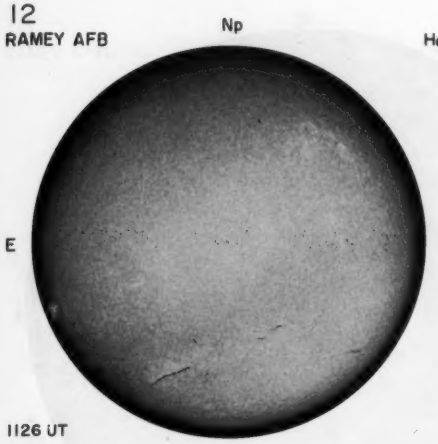
DELTAY = 12.7
DELTAX = 9.5

MAGNETOGRAM
Solid - Plus
Dotted - Minus



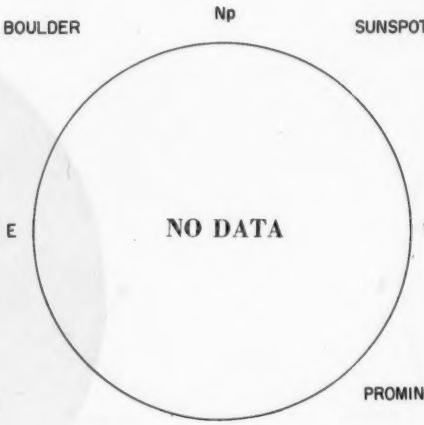
12

RAMEY AFB



1126 UT

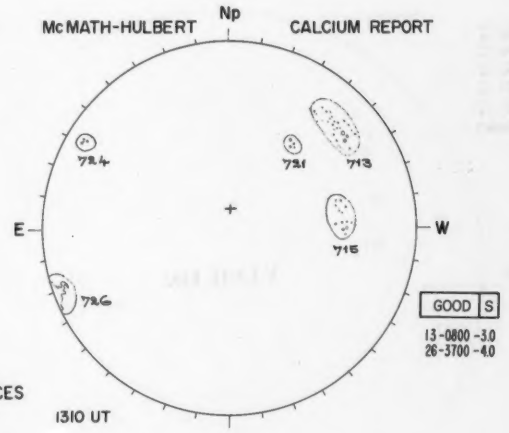
Hα BOULDER



SUNSPOTS

McMATH-HULBERT

CALCIUM REPORT



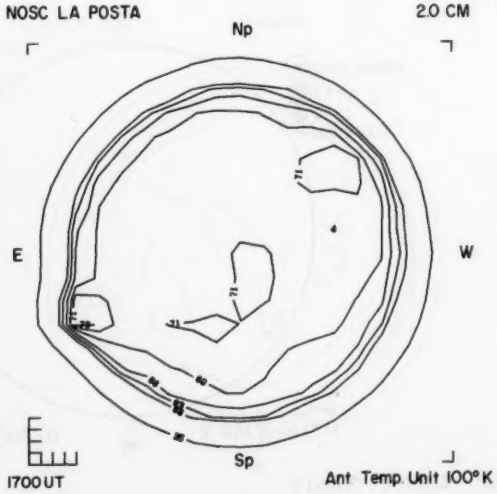
GOOD | S

13 -0800 -3.0
26 -3700 -4.0

1310 UT

PROMINENCES

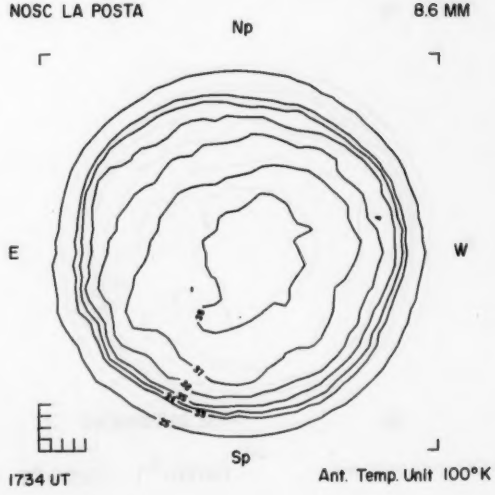
NOSC LA POSTA 2.0 CM



1700 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM



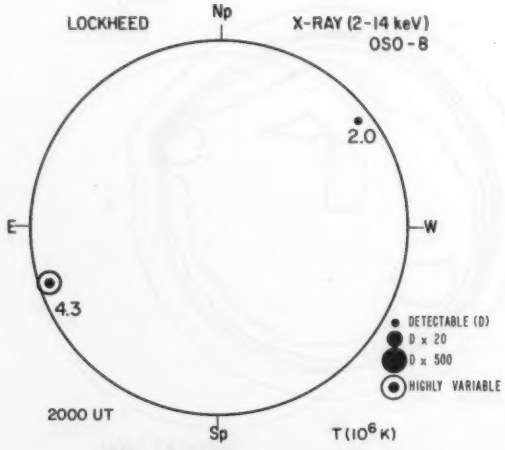
1734 UT

Ant. Temp. Unit 100°K

APRIL 13, 1977 (P =-26.19, B_o =-5.75, L_o =93.96)

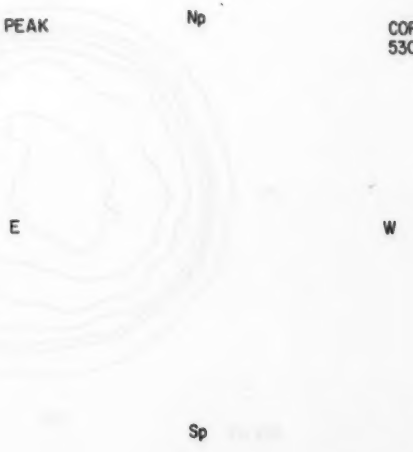
LOCKHEED

X-RAY (2-14 keV)
OSO-8



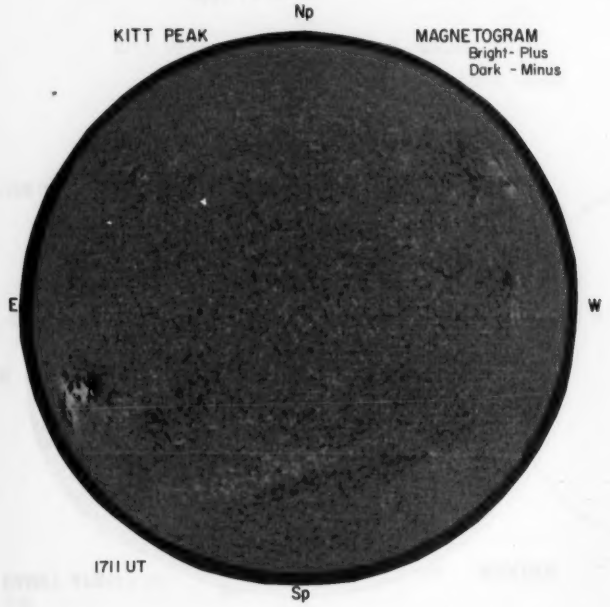
SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å



KITT PEAK

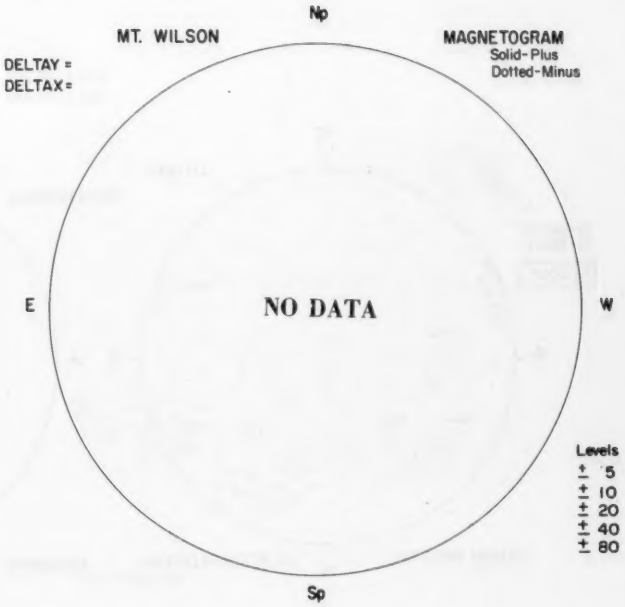
MAGNETOGRAM
Bright - Plus
Dark - Minus



MT. WILSON

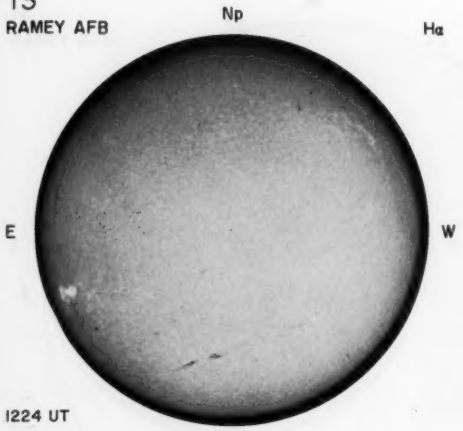
DELTAY =
DELTAX =

MAGNETOGRAM
Solid - Plus
Dotted - Minus



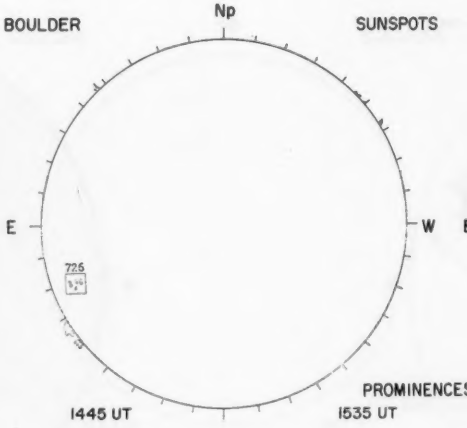
13

RAMEY AFB



1224 UT

Hα BOULDER



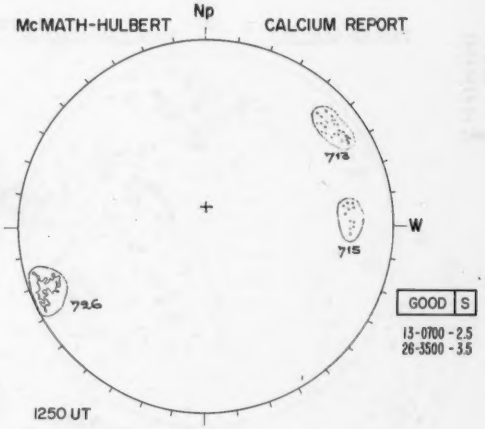
1445 UT

SUNSPOTS

PROMINENCES

1535 UT

McMATH-HULBERT



1250 UT

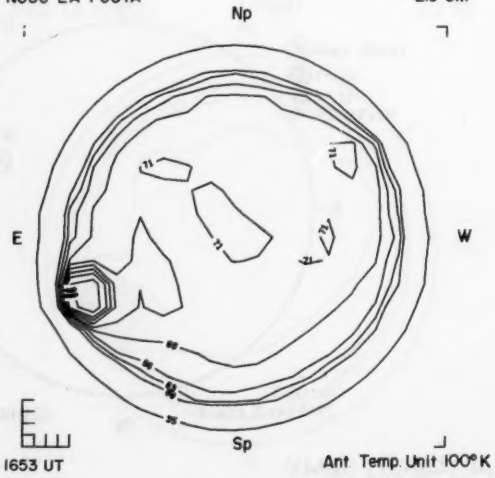
CALCIUM REPORT

GOOD | S

13-0700 - 2.5
26-3500 - 3.5

NOSC LA POSTA

2.0 CM

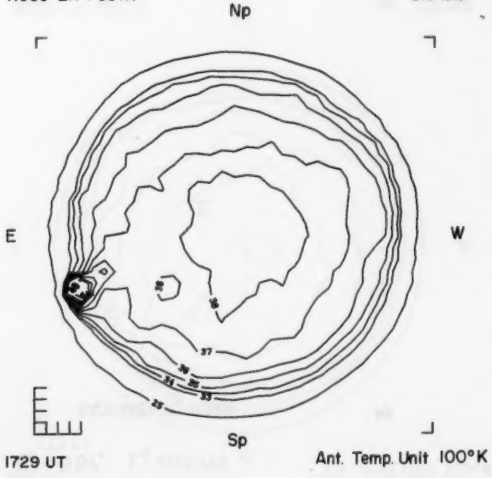


1653 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM



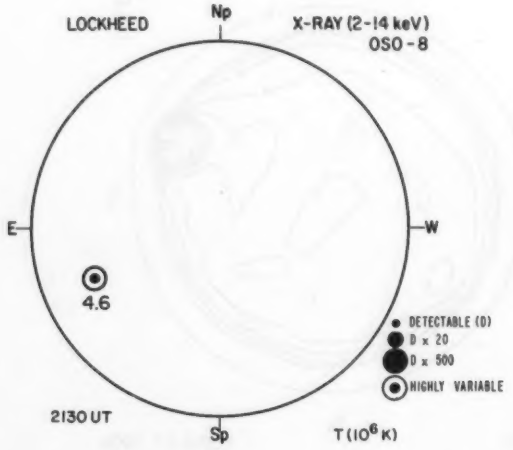
1729 UT

Ant. Temp. Unit 100°K

APRIL 14, 1977 (P =-26.14, B_o =-5.67, L_o =80.76)

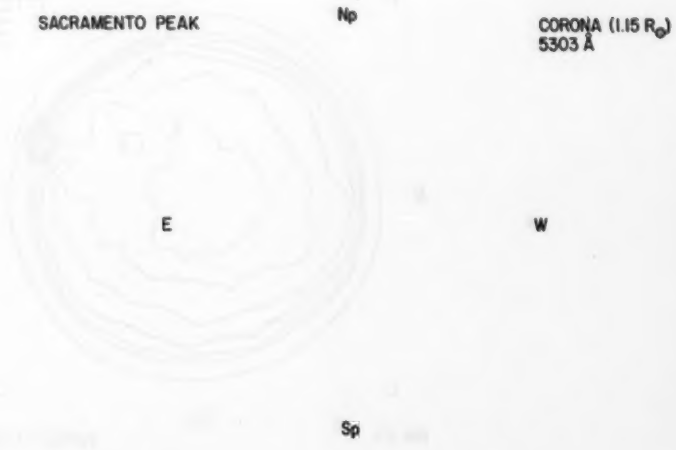
LOCKHEED

X-RAY (2-14 keV)
OSO-8



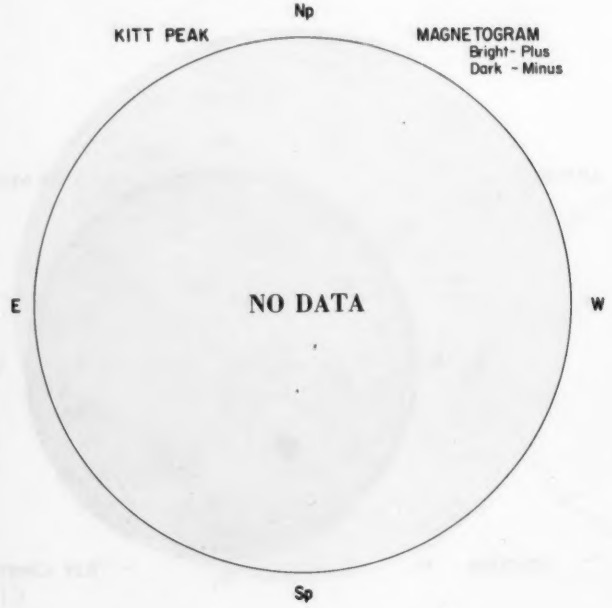
SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å



KITT PEAK

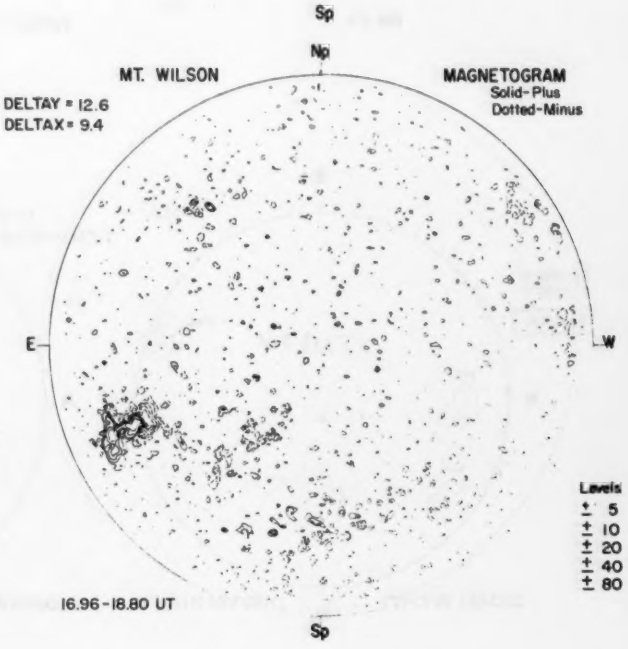
MAGNETOGRAM
Bright - Plus
Dark - Minus



MT. WILSON

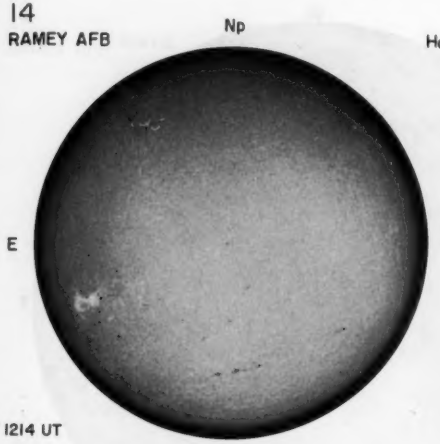
DELTAY = 12.6
DELTAX = 9.4

MAGNETOGRAM
Solid - Plus
Dotted - Minus



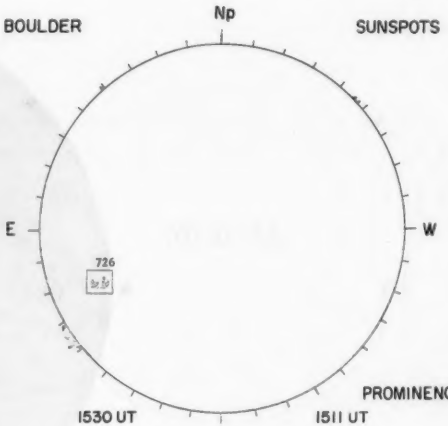
14

RAMEY AFB



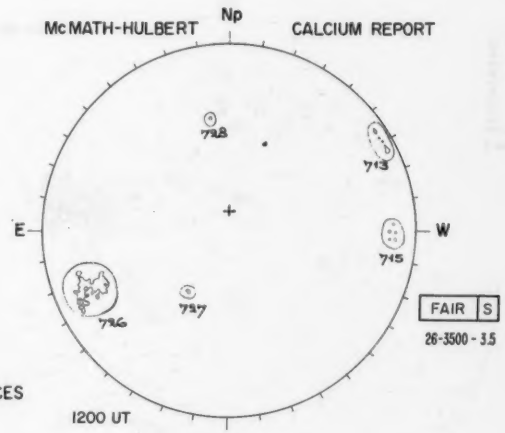
1214 UT

Hα BOULDER



1530 UT

SUNSPOTS



1511 UT

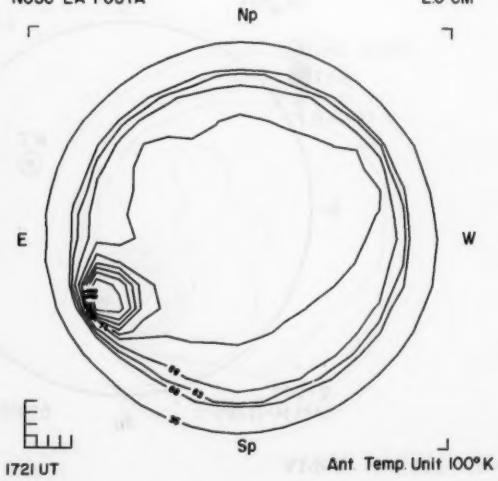
McMATH-HULBERT

CALCIUM REPORT

1200 UT

PROMINENCES

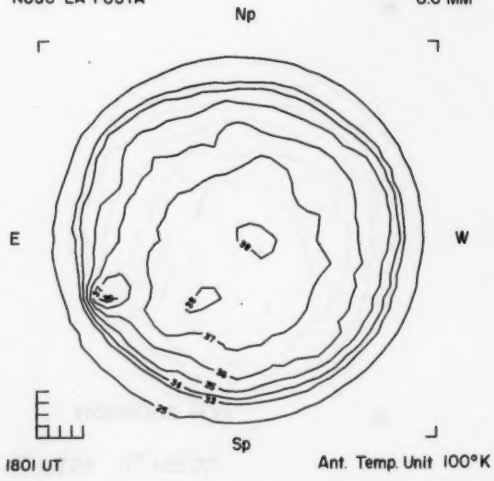
NOSC LA POSTA 2.0 CM



1721 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM

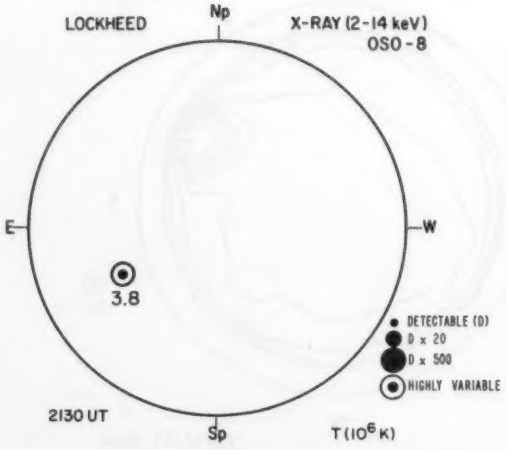


1801 UT

Ant. Temp. Unit 100°K

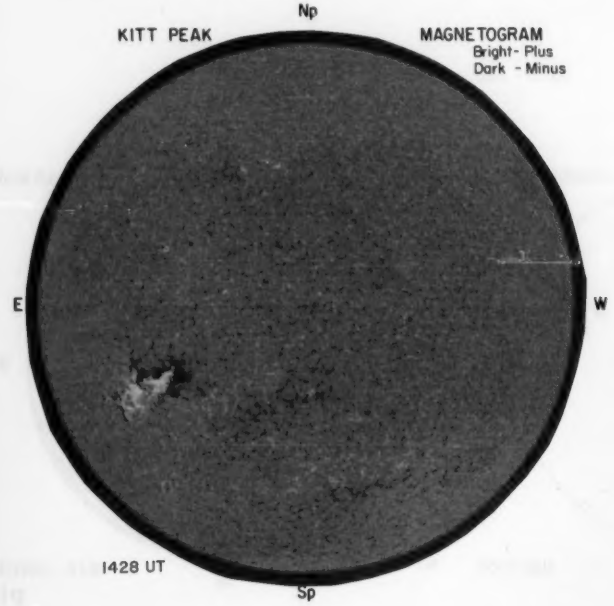
APRIL 15, 1977 (P =-26.09, B_o =-5.59, L_o =67.55)

LOCKHEED X-RAY (2-14 keV) OSO-8

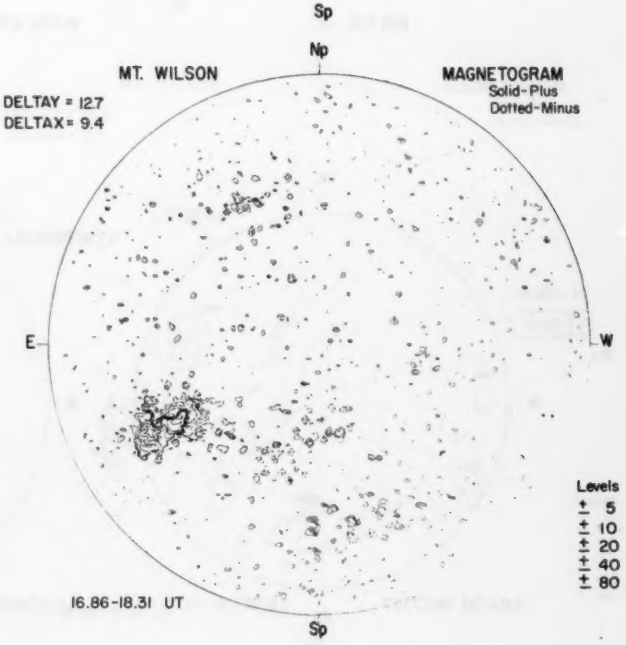


SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å

KITT PEAK MAGNETOGRAM Bright-Plus Dark-Minus

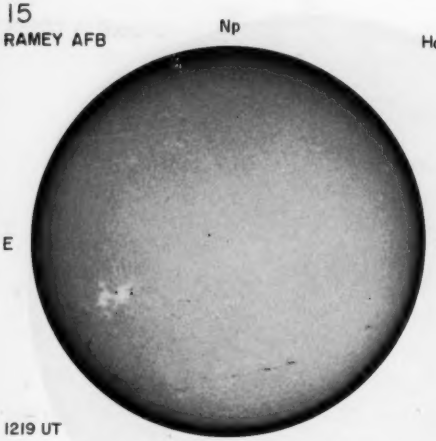


MT. WILSON MAGNETOGRAM Solid-Plus Dotted-Minus



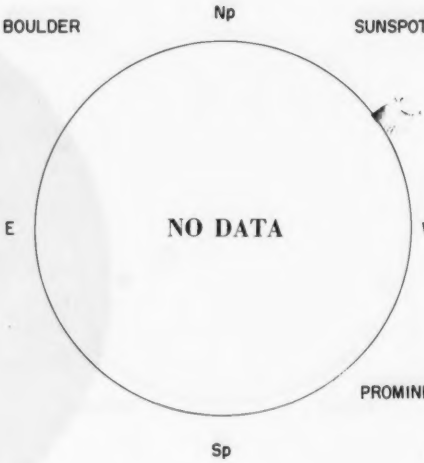
15

RAMEY AFB



1219 UT

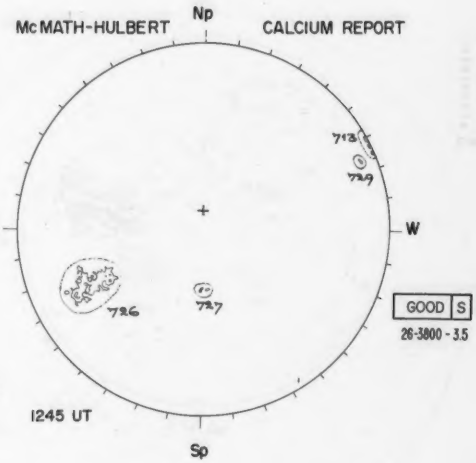
Hα BOULDER



SUNSPOTS

PROMINENCES

McMATH-HULBERT



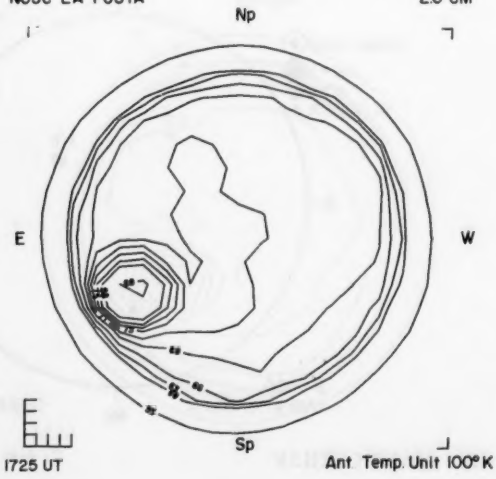
1245 UT

CALCIUM REPORT

GOOD | S

26-3800 - 3.5

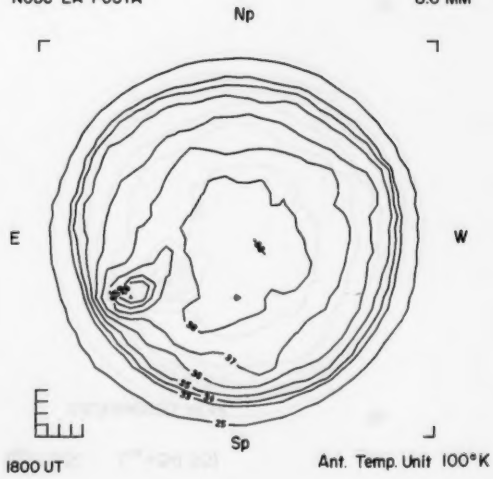
NOSC LA POSTA 2.0 CM



1725 UT

Ant. Temp. Unit 100°K

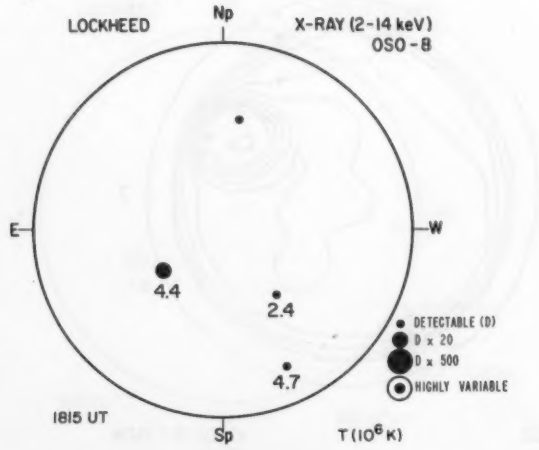
NOSC LA POSTA 8.6 MM

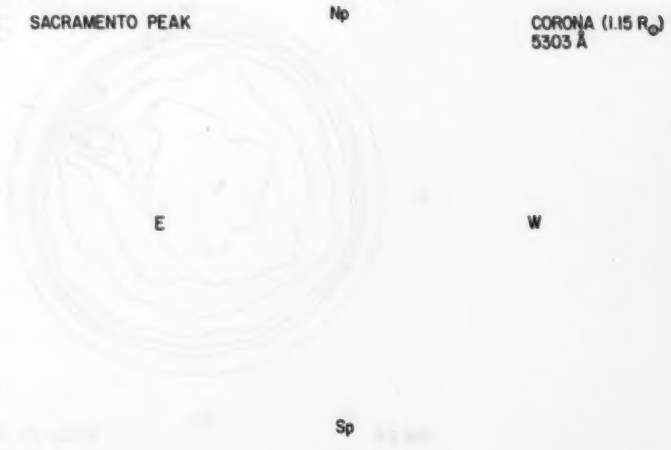


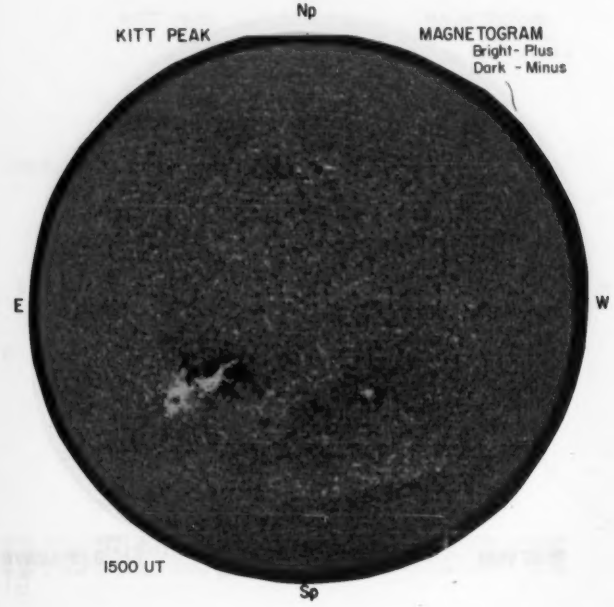
1800 UT

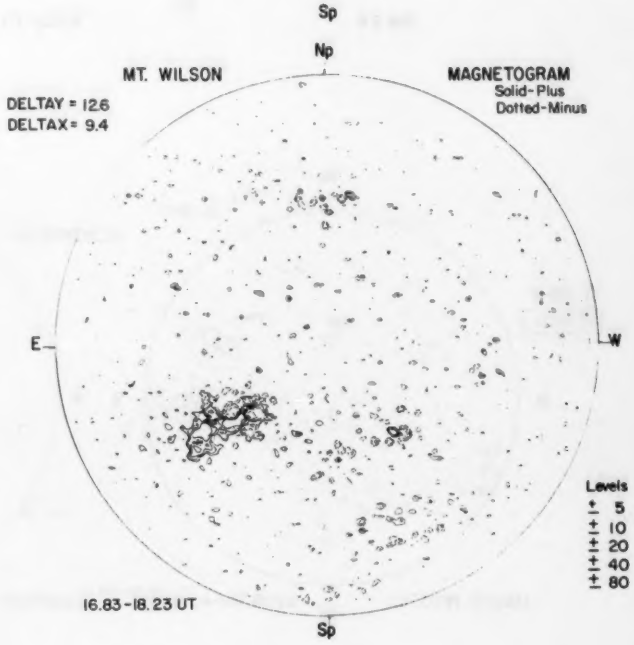
Ant. Temp. Unit 100°K

APRIL 16, 1977 (P=-26.03, B_o=-5.51, L_o=54.35)

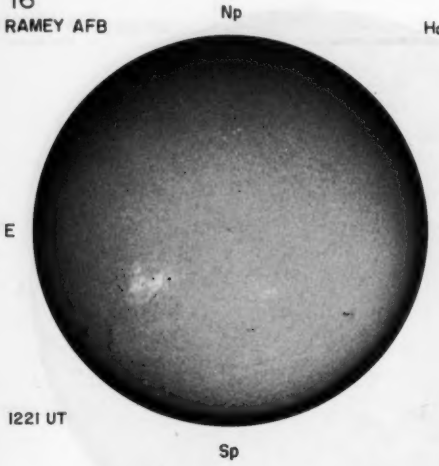


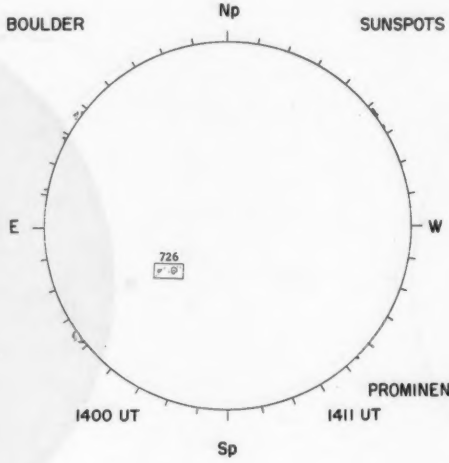


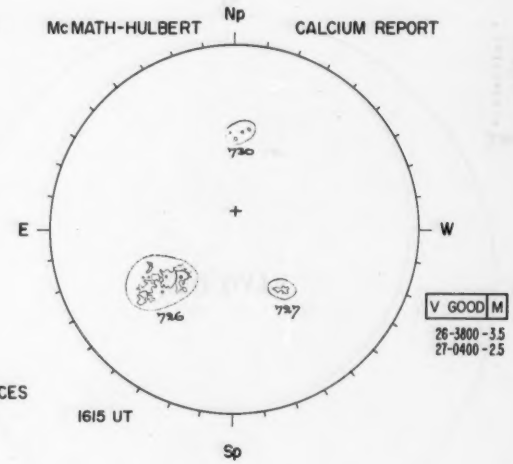


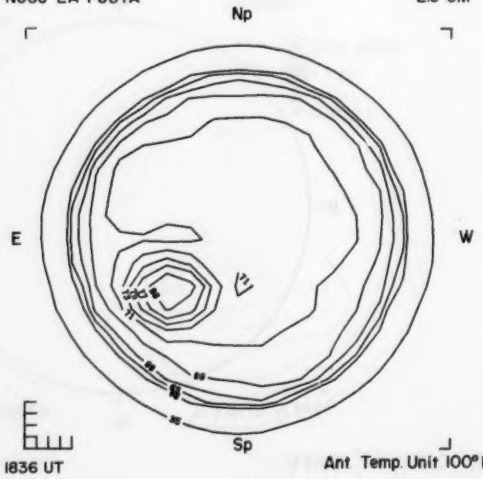


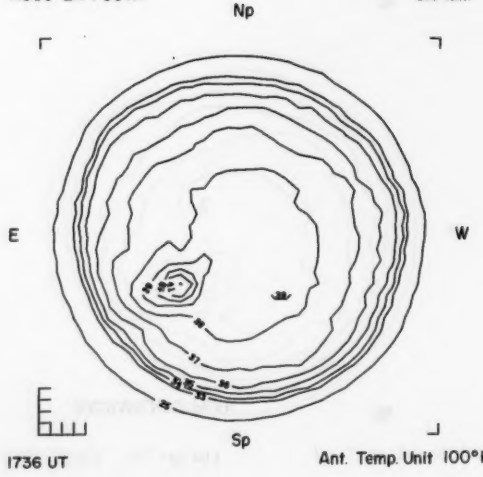
16


RAMEY AFB
Np
Hα
E
W
1221 UT
Sp


BOULDER
Np
SUNSPOTS
E
W
726
PROMINENCES
1400 UT
1411 UT
Sp


McMATH-HULBERT
Np
CALCIUM REPORT
E
W
730
726
727
V GOOD M
26-3800 -3.5
27-0400 -2.5
1615 UT
Sp


NOSC LA POSTA
2.0 CM
Np
E
W
Sp
1836 UT
Ant Temp. Unit 100°K


NOSC LA POSTA
8.6 MM
Np
E
W
Sp
1736 UT
Ant. Temp. Unit 100°K

APRIL 17, 1977 (P =-25.96, B_0 =-5.43, L_0 =41.14)

LOCKHEED

Np

X-RAY (2-14 keV)
OSO-8

E

W

2.8

DETECTABLE (D)
D x 20
D x 500
HIGHLY VARIABLE

1645 UT

Sp

T (10^6 K)

SACRAMENTO PEAK

Np

CORONA (1.15 $R_\odot$)
5303 Å

E

W

KITT PEAK

Np

MAGNETOGRAM
Bright - Plus
Dark - Minus

E

W

1402 UT

Sp

Sp

Np

MT. WILSON

MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY =
DELTAX =

E

NO DATA

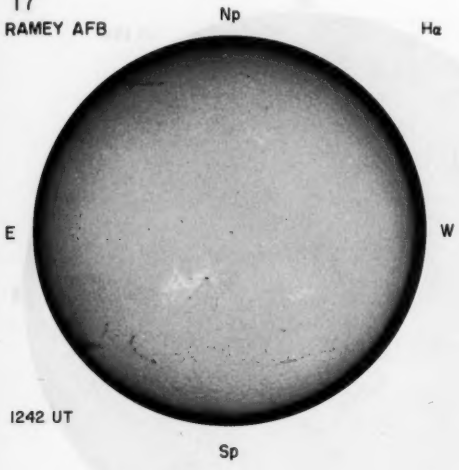
W

Levels
+ 5
+ + 10
+ + + 20
+ + + + 40
+ + + + + 80

Sp

17

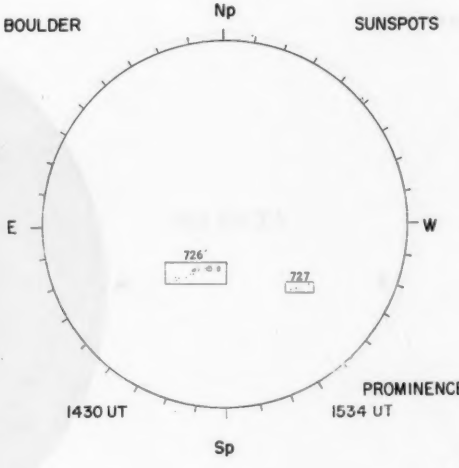
RAMEY AFB



Hα

1242 UT

BOULDER

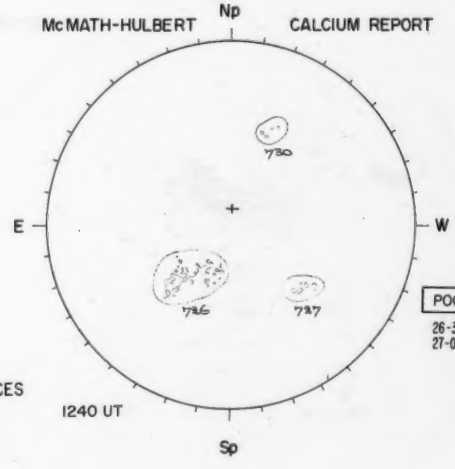


1430 UT

SUNSPOTS

1534 UT

McMATH-HULBERT



1240 UT

CALCIUM REPORT

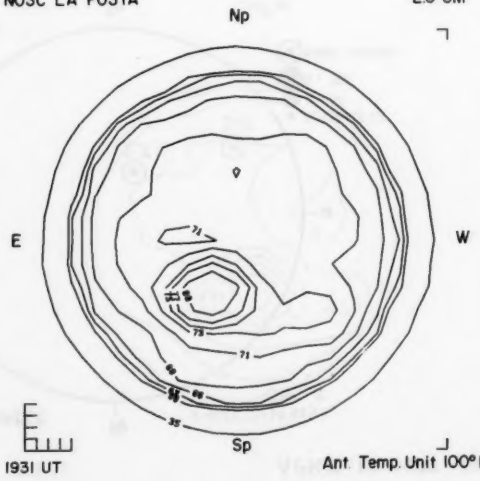
POOR	M

26-3200-3.0
27-0500-2.5

PROMINENCES

NOSC LA POSTA

2.0 CM

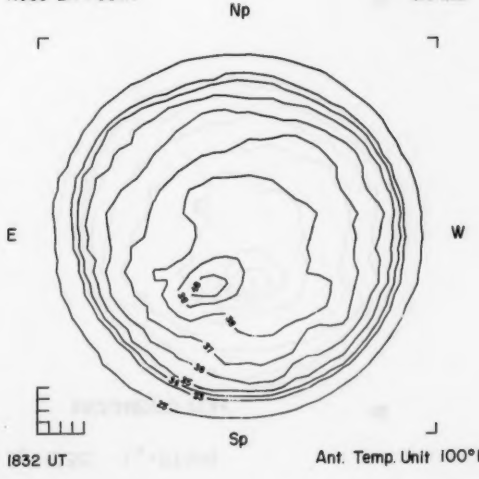


1931 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

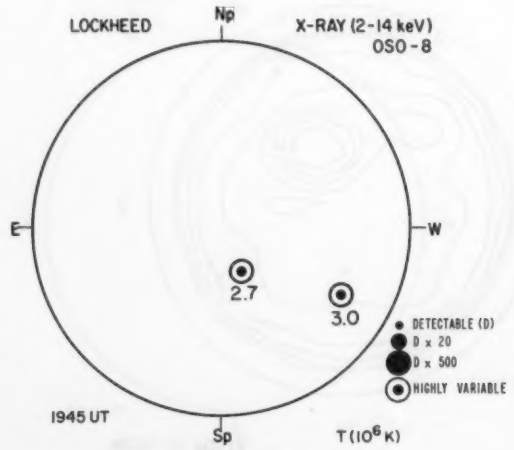


1832 UT

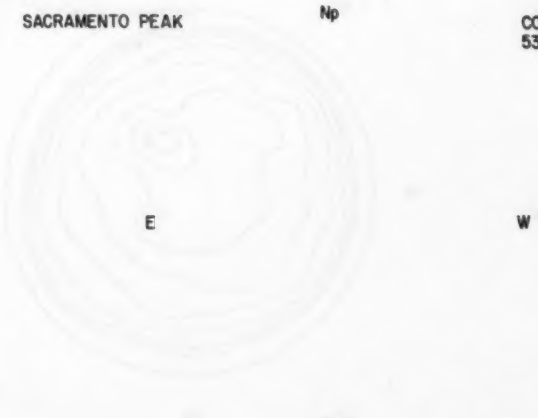
Ant. Temp. Unit 100°K

APRIL 18, 1977 (P =-25.88, B_o =-5.35, L_o =27.94)

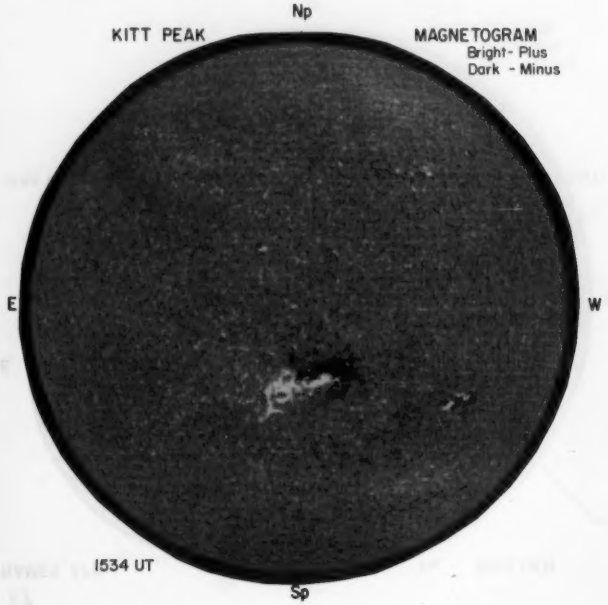
LOCKHEED X-RAY (2-14 keV) OSO-8



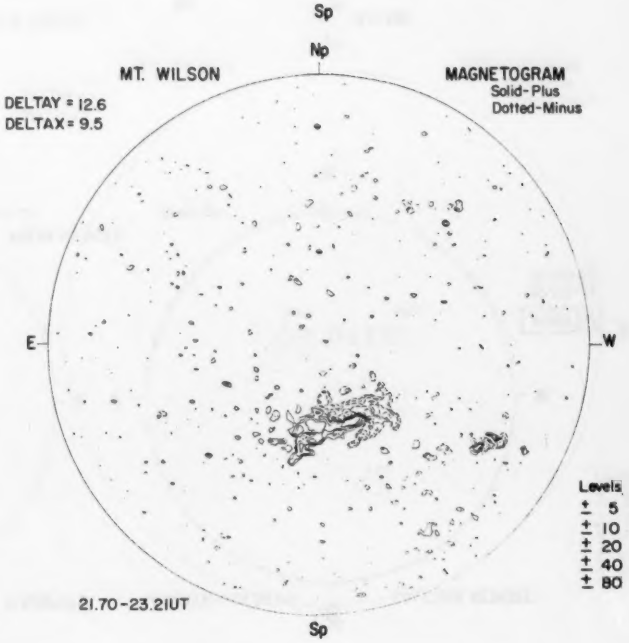
SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å



KITT PEAK MAGNETOGRAM Bright - Plus Dark - Minus

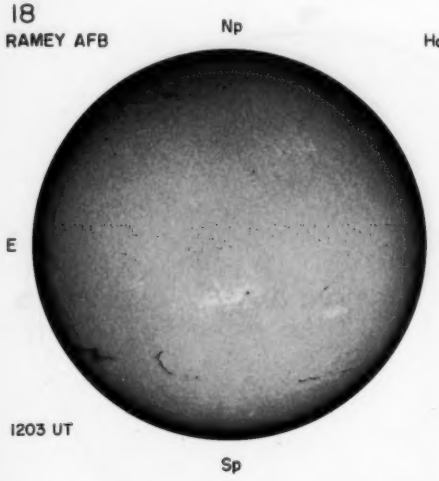


MT. WILSON MAGNETOGRAM Solid - Plus Dotted - Minus



18

RAMEY AFB



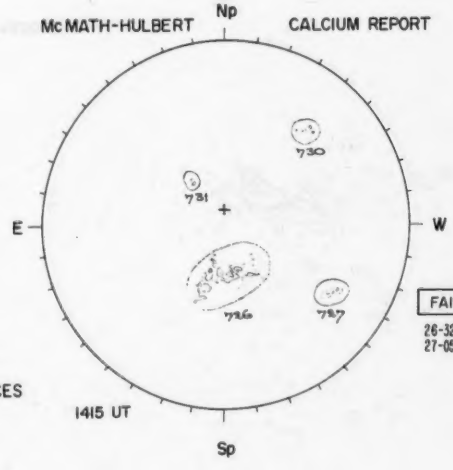
1203 UT

Hα BOULDER

SUNSPOTS

PROMINENCES

McMATH-HULBERT



1415 UT

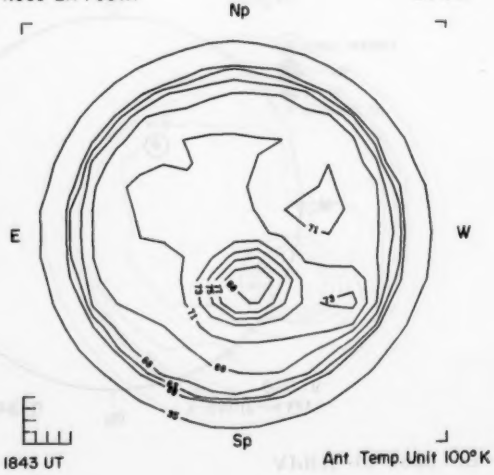
CALCIUM REPORT

FAIR D

26-3200 -3.5

27-0500 -2.5

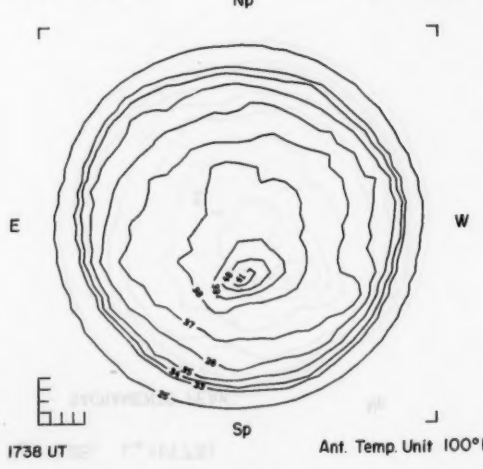
NOSC LA POSTA 2.0 CM



1843 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM



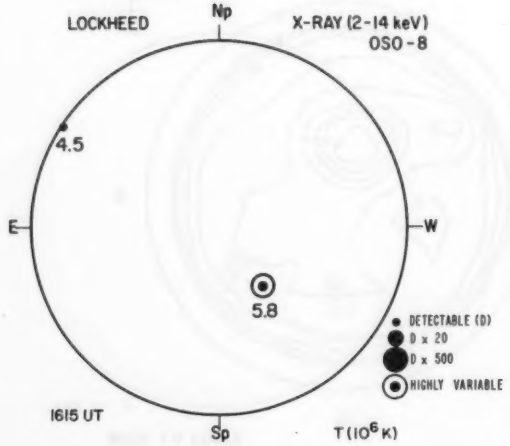
1738 UT

Ant. Temp. Unit 100°K

67
Apr 77

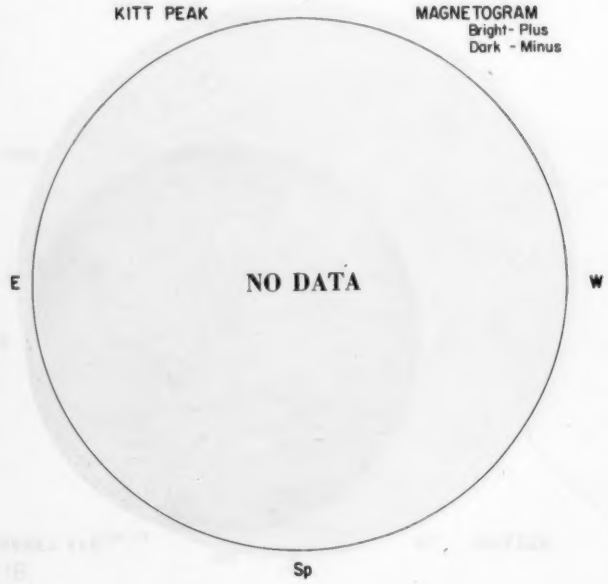
APRIL 19, 1977 (P =-25.79, B_o =-5.26, L_o =14.73)

LOCKHEED X-RAY (2-14 keV) OSO-8

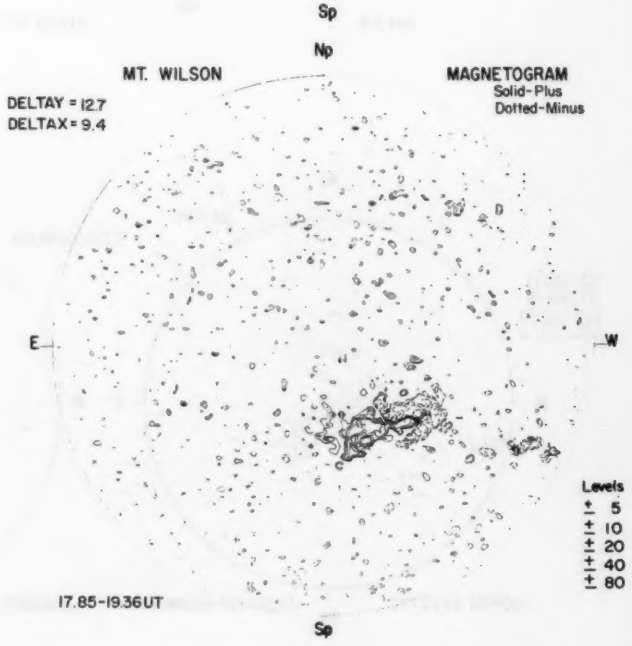


SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å

KITT PEAK MAGNETOGRAM Bright-Plus Dark-Minus

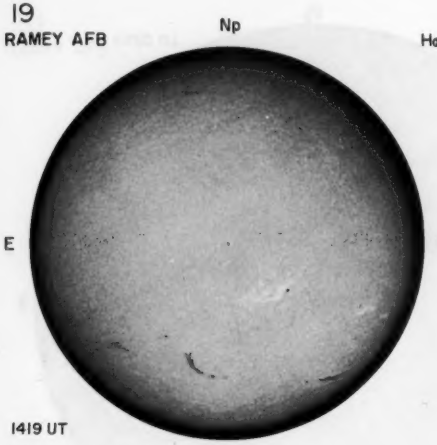


MT. WILSON MAGNETOGRAM Solid-Plus Dotted-Minus



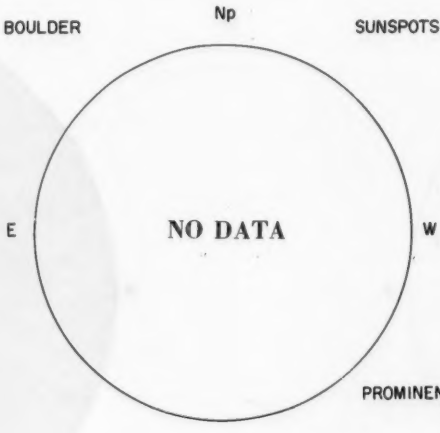
19

RAMEY AFB



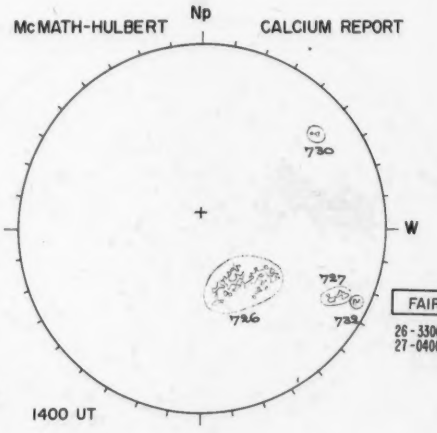
1419 UT

Hα BOULDER



PROMINENCES

SUNSPOTS McMATH-HULBERT



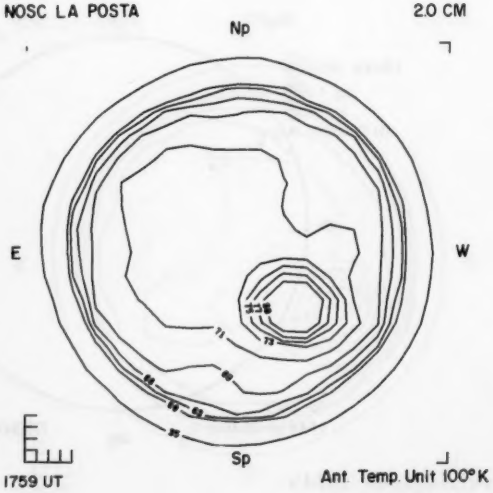
1400 UT

CALCIUM REPORT

FAIR S

26-3300-3.5
27-0400-2.5

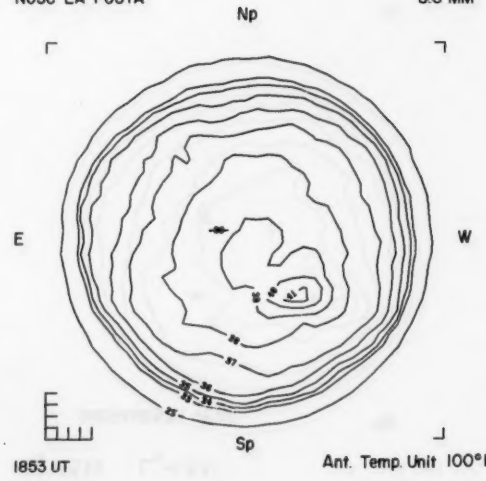
NOSC LA POSTA 2.0 CM



1759 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM

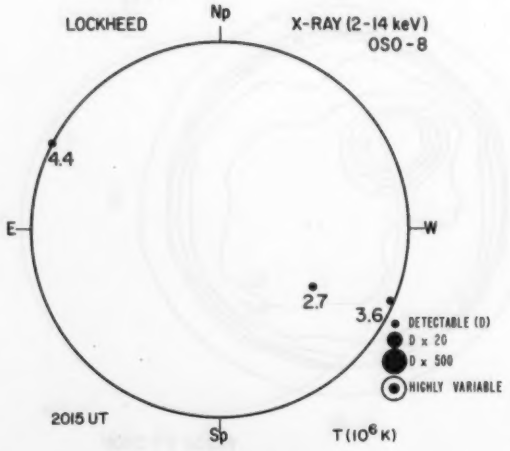


1853 UT

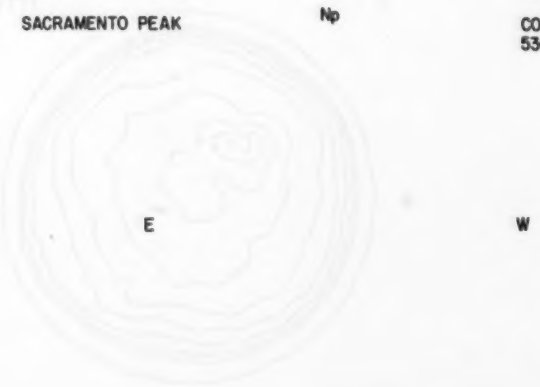
Ant. Temp. Unit 100°K

APRIL 20, 1977 (P =-25.70, B_o =-5.18 L_o =1.53)

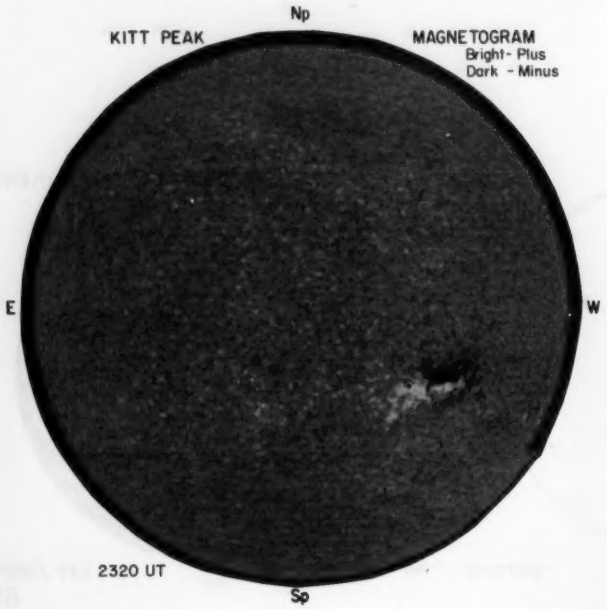
LOCKHEED X-RAY (2-14 keV) OSO-8



SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å

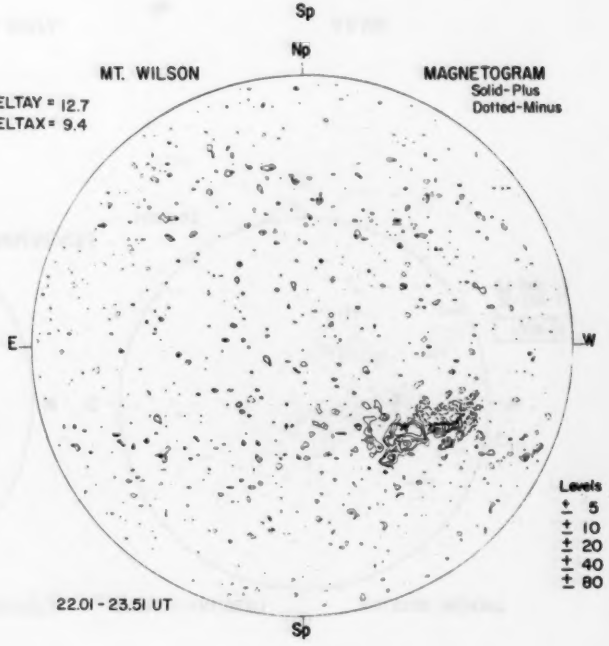


KITT PEAK MAGNETOGRAM Bright - Plus Dark - Minus



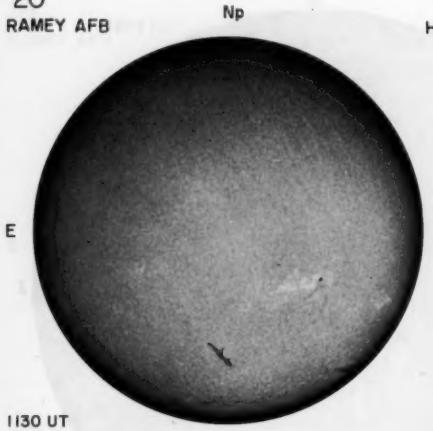
MT. WILSON MAGNETOGRAM Solid - Plus Dotted - Minus

DELTAY = 12.7
DELTAX = 9.4



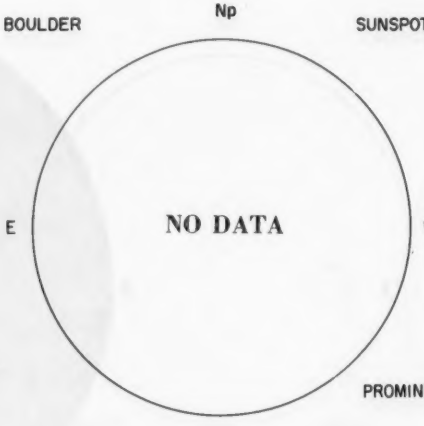
20

RAMEY AFB



1130 UT

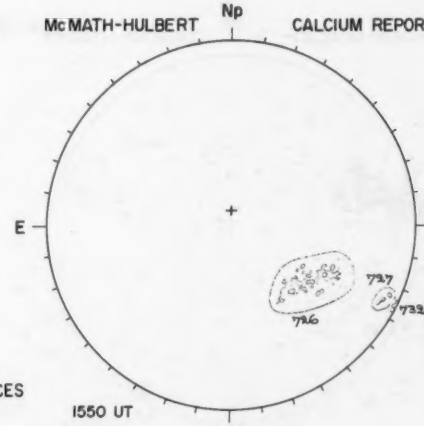
Hα BOULDER



SUNSPOTS

PROMINENCES

McMATH-HULBERT



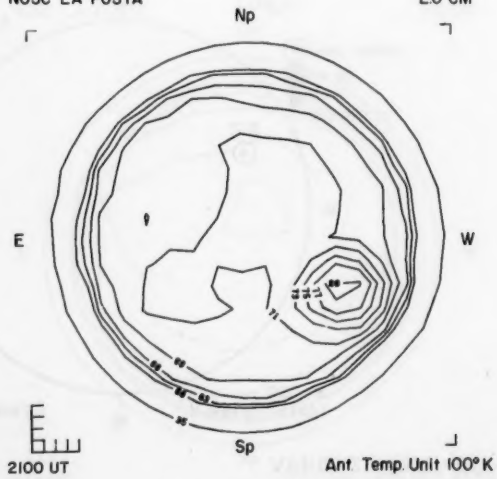
1550 UT

CALCIUM REPORT

FAIR	M

26-3000-35
27-0400-25
32-0400-25

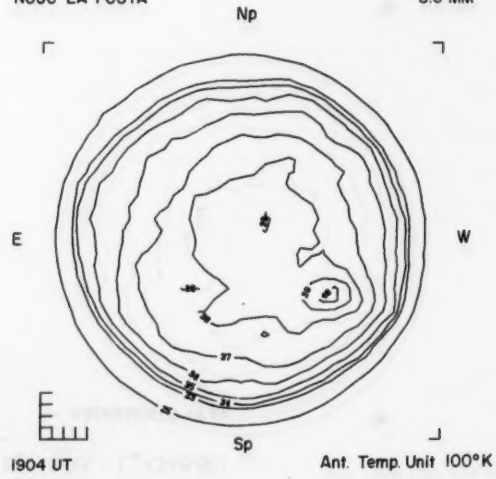
NOSC LA POSTA 2.0 CM



2100 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM



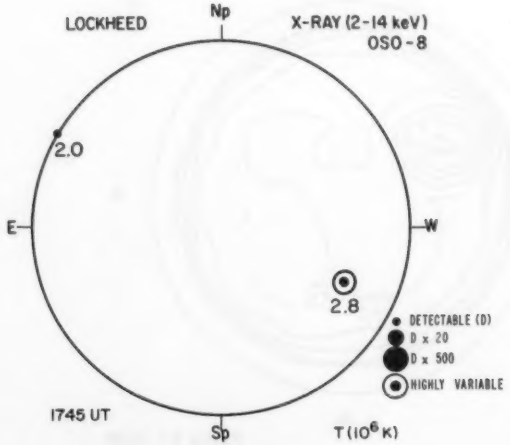
1904 UT

Ant. Temp. Unit 100°K

71
Apr 77

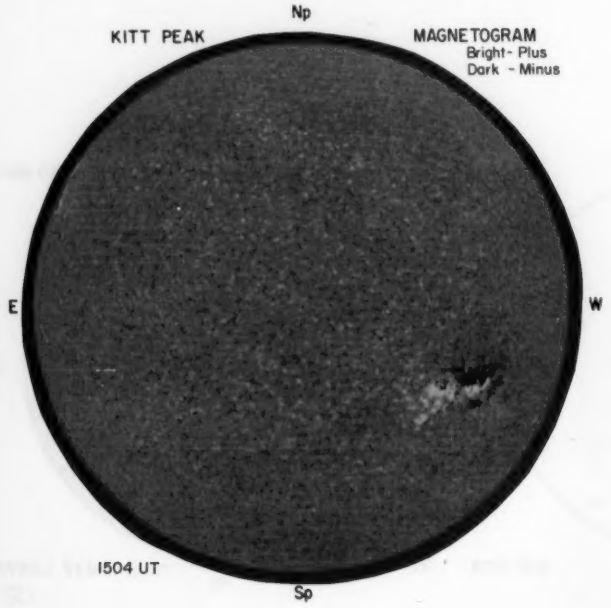
APRIL 21, 1977 (P =-25.60, B_o =-5.09, L_o =348.32)

LOCKHEED X-RAY (2-14 keV) OSO-8

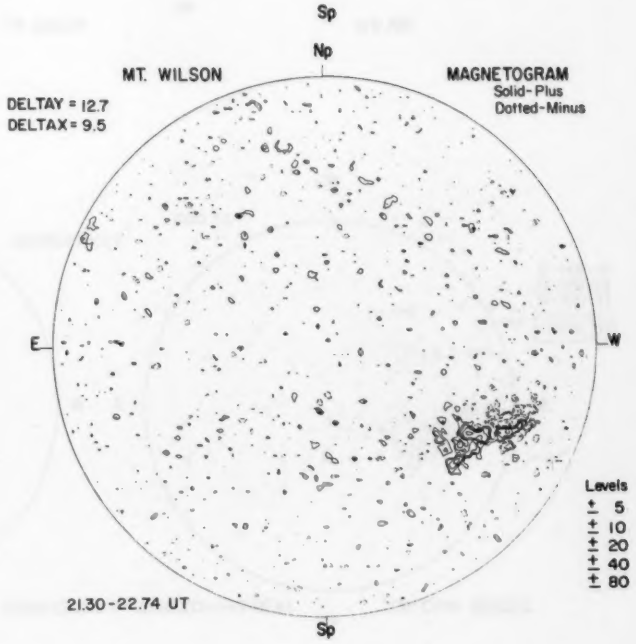


SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å

KITT PEAK MAGNETOGRAM Bright - Plus Dark - Minus

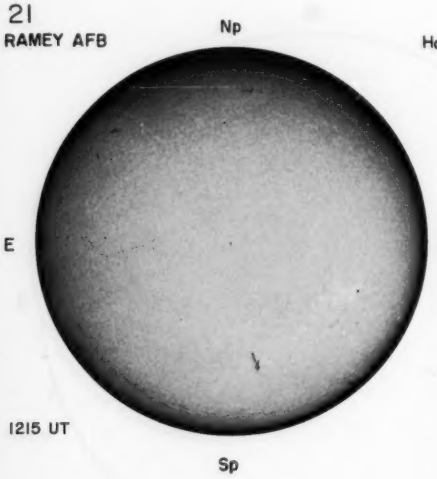


MT. WILSON MAGNETOGRAM Solid - Plus Dotted - Minus



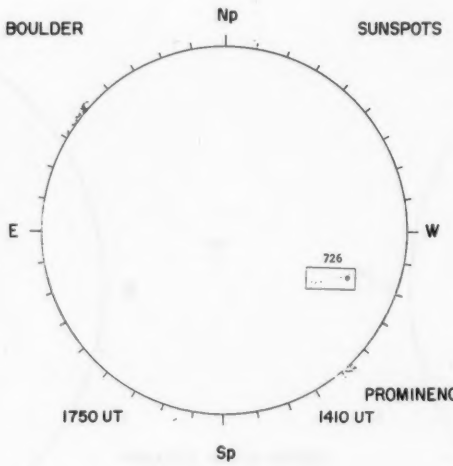
21

RAMEY AFB



1215 UT

Hα BOULDER

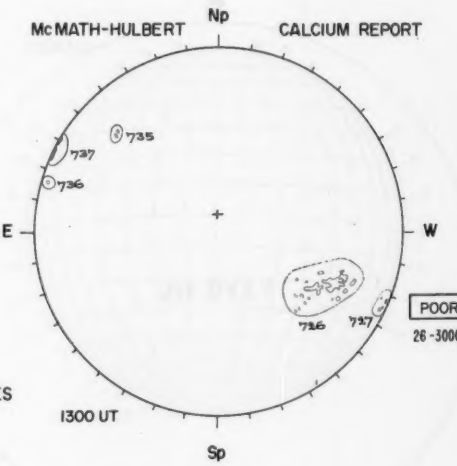


1750 UT

SUNSPOTS

1410 UT

McMATH-HULBERT



1300 UT

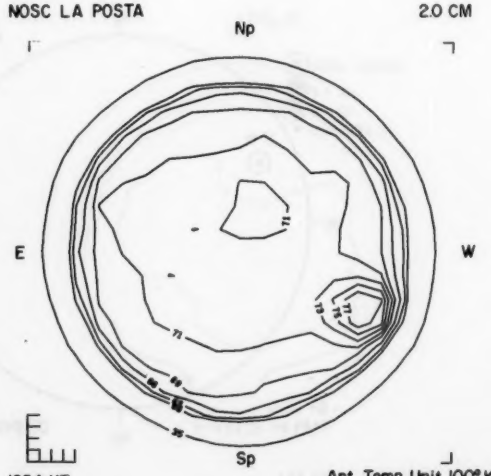
CALCIUM REPORT

POOR | S

26-3000-3.5

PROMINENCES

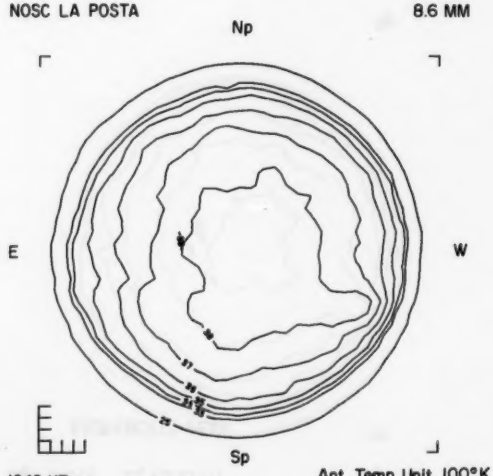
NOSC LA POSTA 2.0 CM



1854 UT

Ant. Temp. Unit 100°K

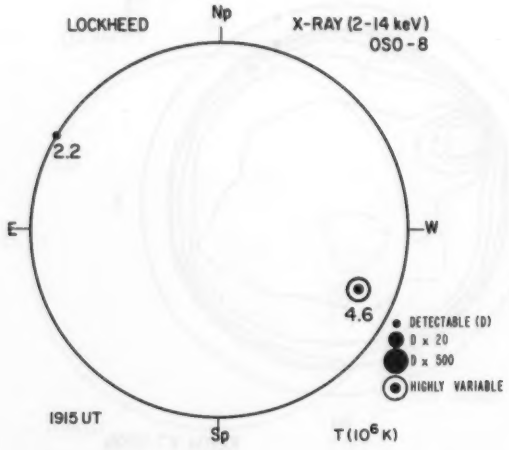
NOSC LA POSTA 8.6 MM

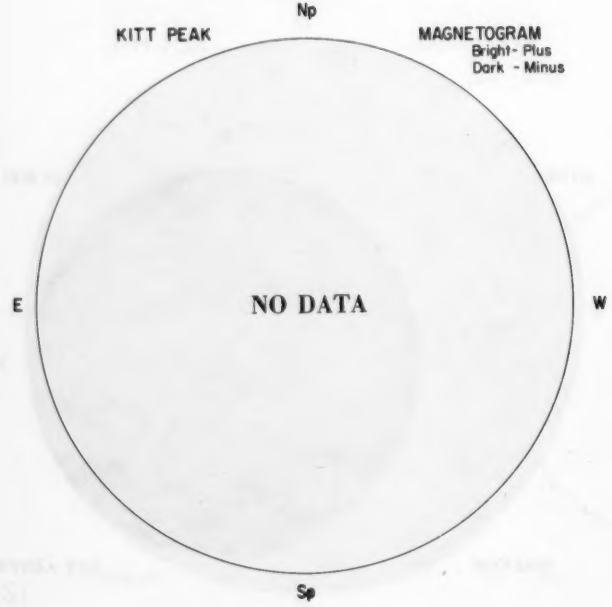


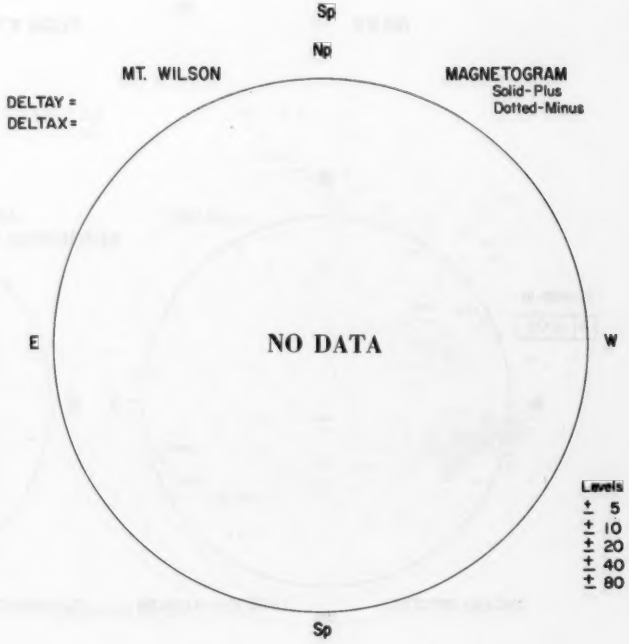
1942 UT

Ant. Temp. Unit 100°K

APRIL 22, 1977 (P=-25.49, B_o=-5.00, L_o=335.11)

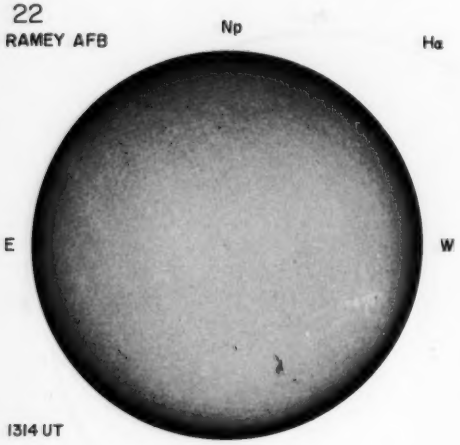






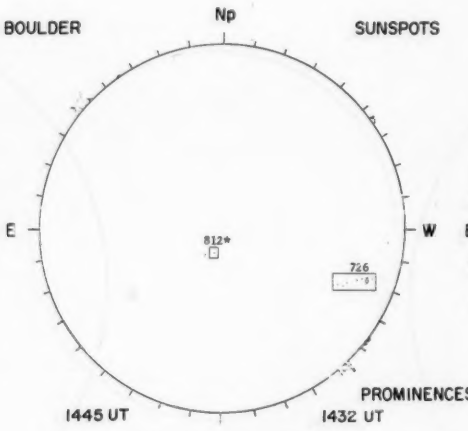
22

RAMEY AFB



1314 UT

Hα BOULDER



1445 UT

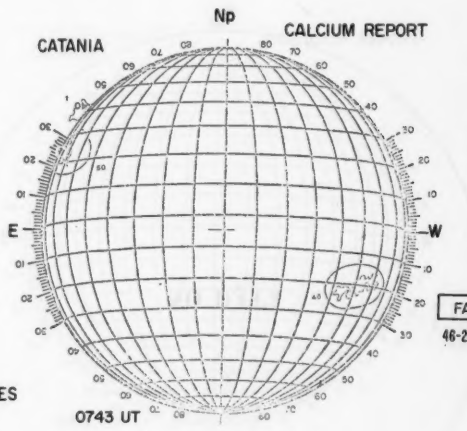
SUNSPOTS

PROMINENCES

1432 UT

*BOULDER REGION NUMBER

CATANIA



0743 UT

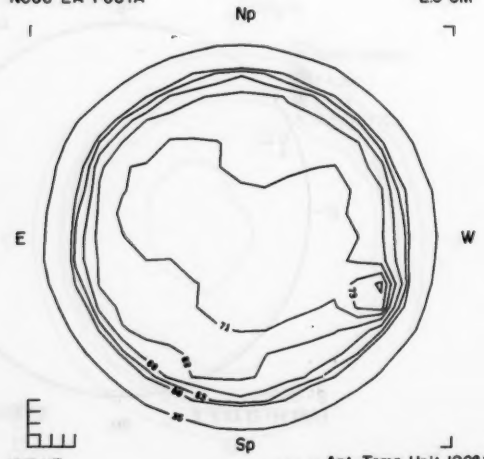
CALCIUM REPORT

FAIR GD

46-2813 - --

NOSC LA POSTA

2.0 CM

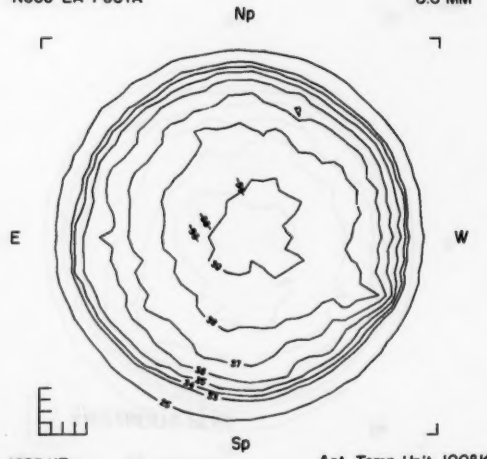


1913 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM



1955 UT

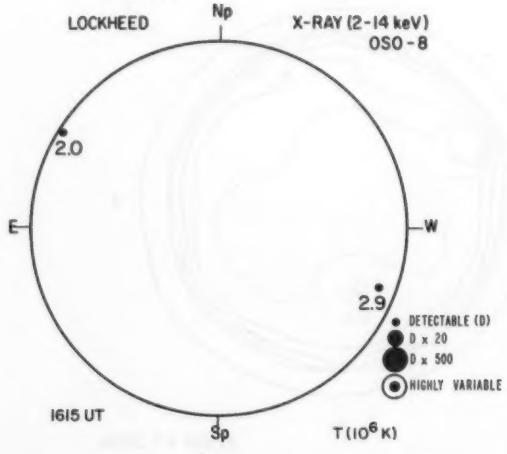
Ant. Temp. Unit 100°K

75 Apr 77

APRIL 23, 1977 (P =-25.38, B_o =-4.91 L_o =321.90)

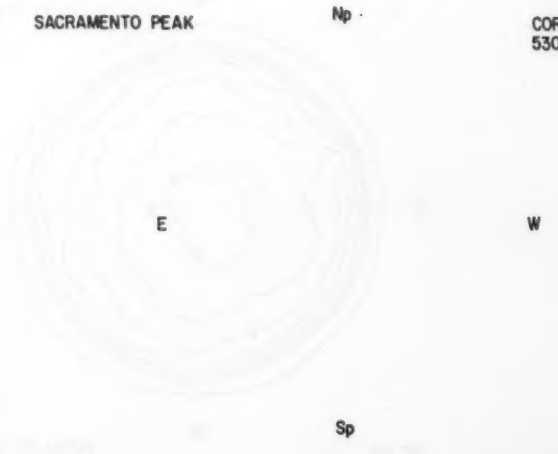
LOCKHEED

X-RAY (2-14 keV)
OSO-8



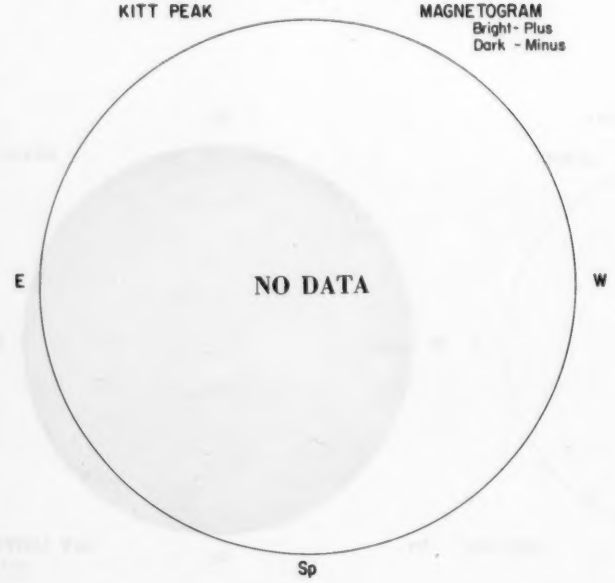
SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å



KITT PEAK

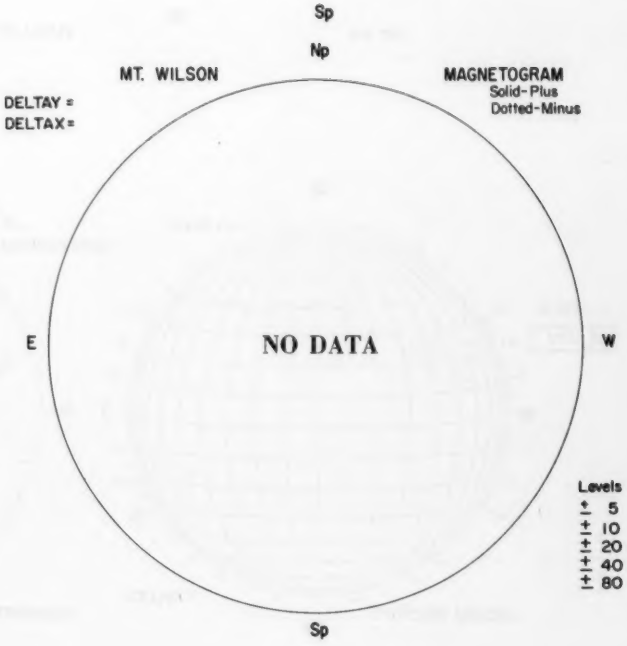
MAGNETOGRAM
Bright - Plus
Dark - Minus



MT. WILSON

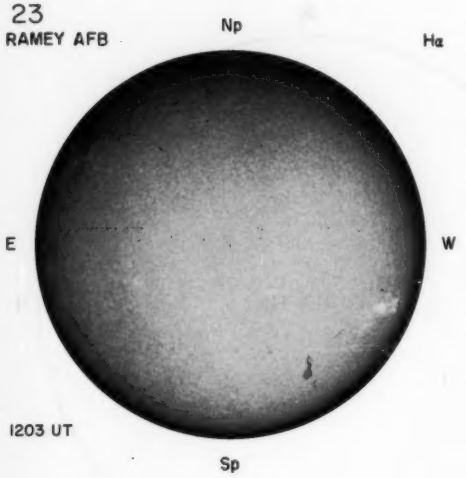
DELTAY =
DELTAX =

MAGNETOGRAM
Solid - Plus
Dotted - Minus



23

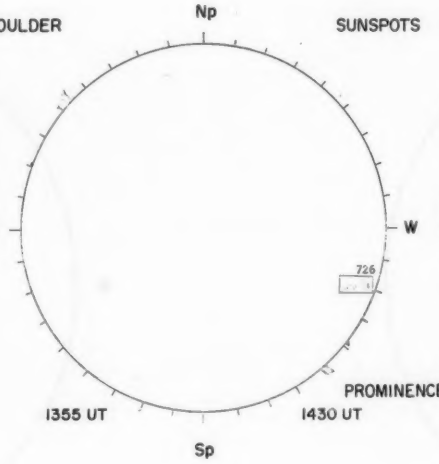
RAMEY AFB



1203 UT

Hα

BOULDER



1355 UT

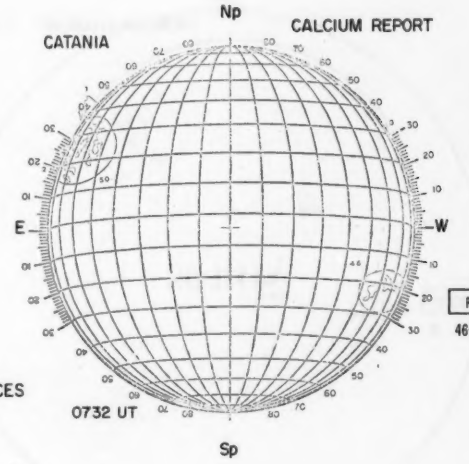
SUNSPOTS

PROMINENCES

1430 UT

CATANIA

CALCIUM REPORT



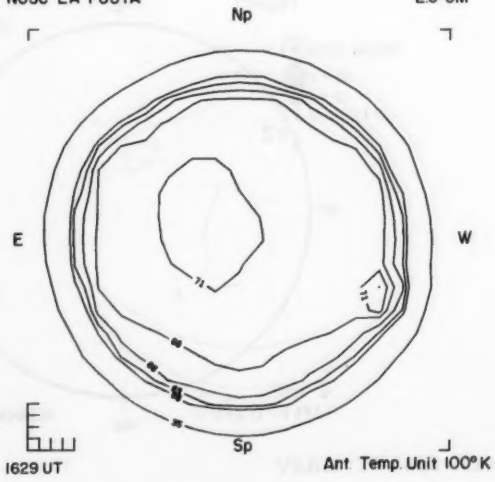
0732 UT

FAIR GD

46-1878- --

NOSC LA POSTA

2.0 CM

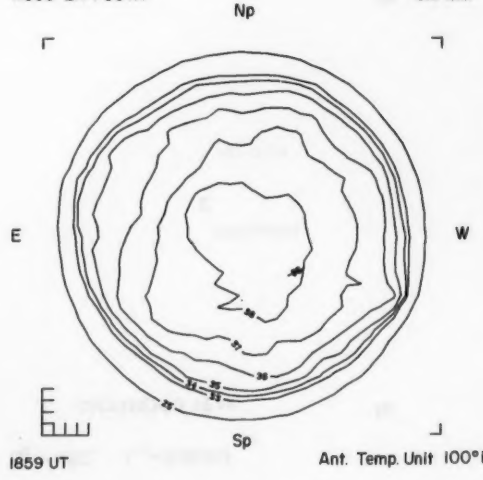


1629 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM



1859 UT

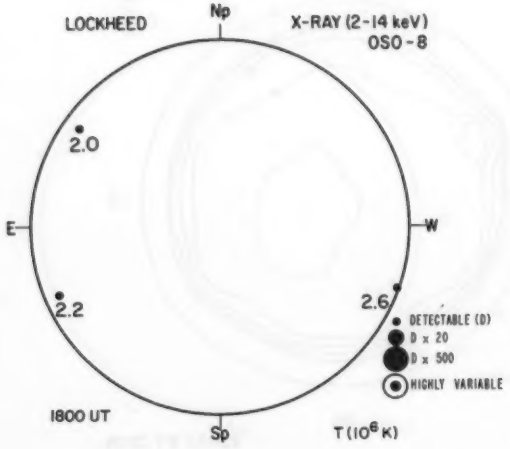
Ant. Temp. Unit 100°K

77
Apr 77

APRIL 24, 1977 (P =-25.26, B_o =-4.82, L_o =308.69)

LOCKHEED

X-RAY (2-14 keV)
OSO-8

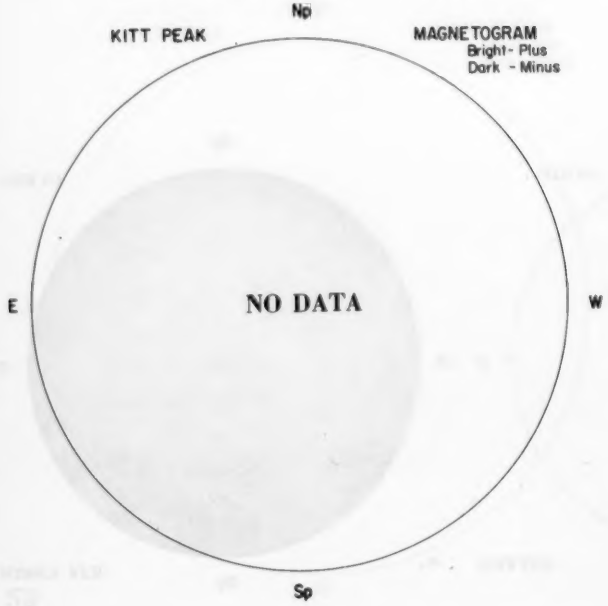


SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å

KITT PEAK

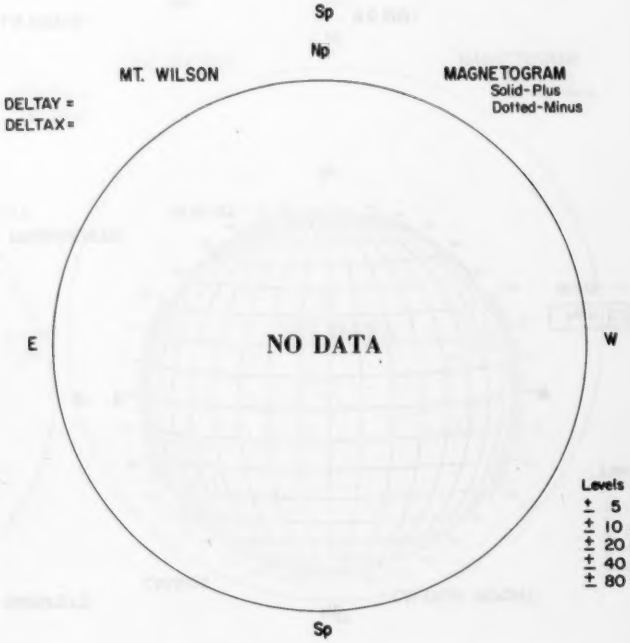
MAGNETOGRAM
Bright - Plus
Dark - Minus



MT. WILSON

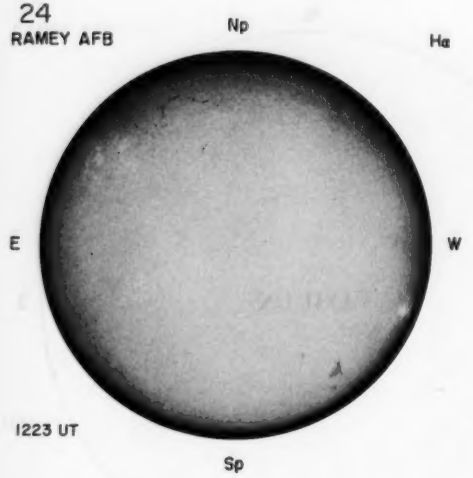
DELTAY =
DELTAX =

MAGNETOGRAM
Solid - Plus
Dotted - Minus



24

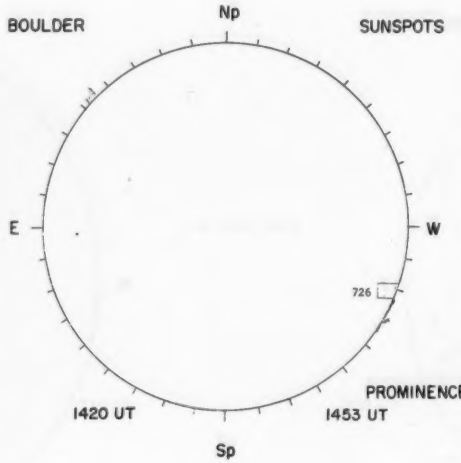
RAMEY AFB



Hα

1223 UT

BOULDER



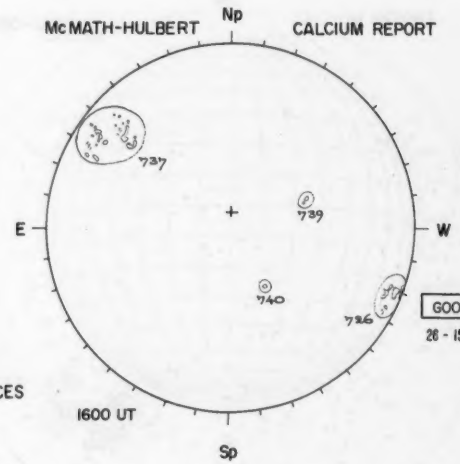
SUNSPOTS

1420 UT

PROMINENCES

1453 UT

McMATH-HULBERT



CALCIUM REPORT

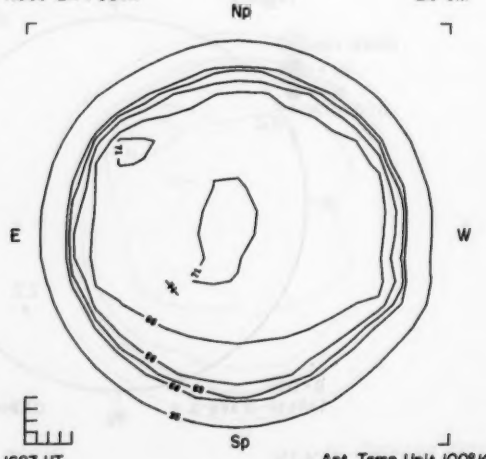
GOOD D

26 - 1500-35

1600 UT

NOSC LA POSTA

2.0 CM



1607 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

NO DATA

EQUIPMENT

---- UT

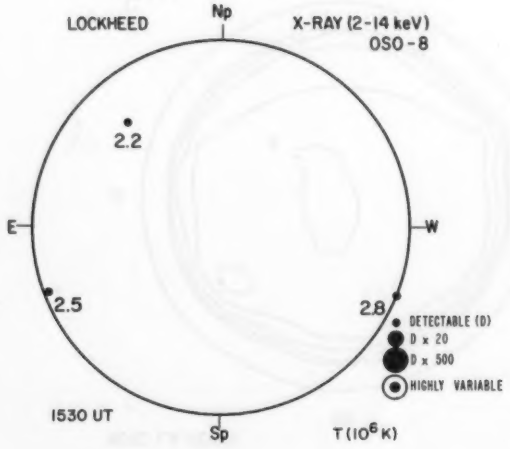
Ant. Temp. Unit 100°K

79
Apr 77

APRIL 25, 1977 (P =-25.13, B_0 =-4.73, L_0 =295.48)

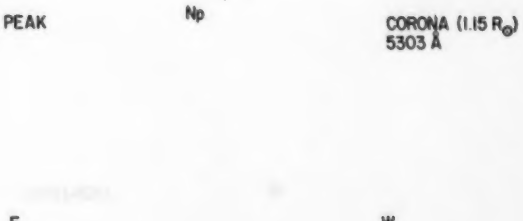
LOCKHEED

X-RAY (2-14 keV)
OSO-8



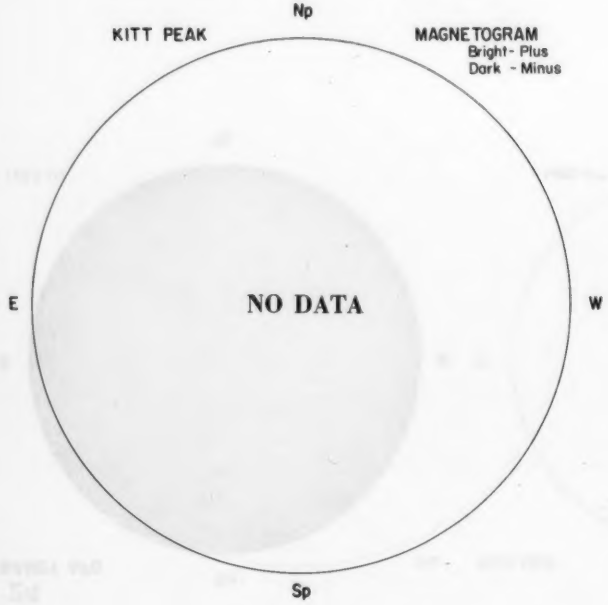
SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å



KITT PEAK

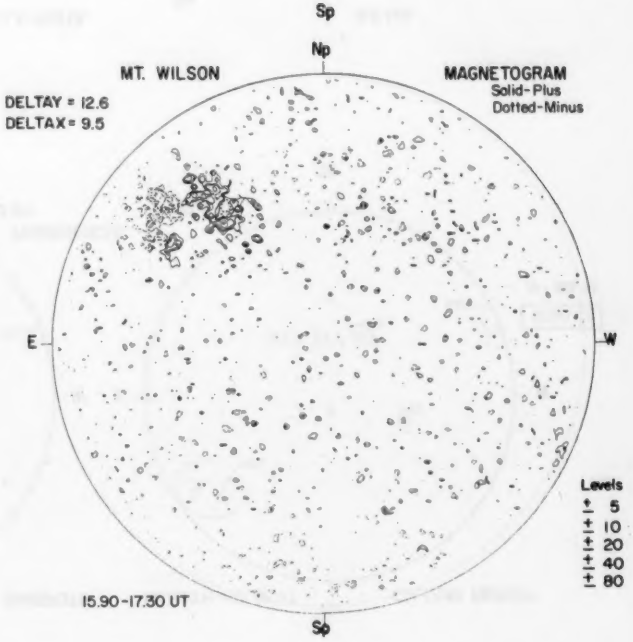
MAGNETOGRAM
Bright - Plus
Dark - Minus



MT. WILSON

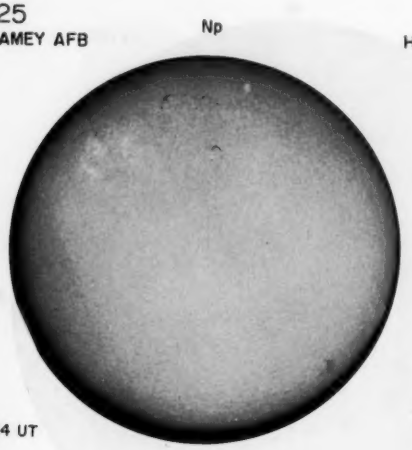
DELTAY = 12.6
DELTAX = 9.5

MAGNETOGRAM
Solid - Plus
Dotted - Minus



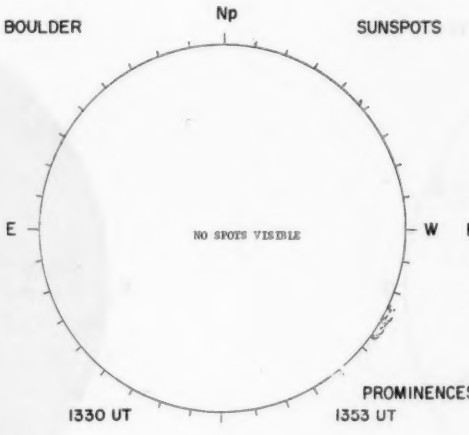
25

RAMEY AFB



1124 UT

Hα BOULDER



1330 UT

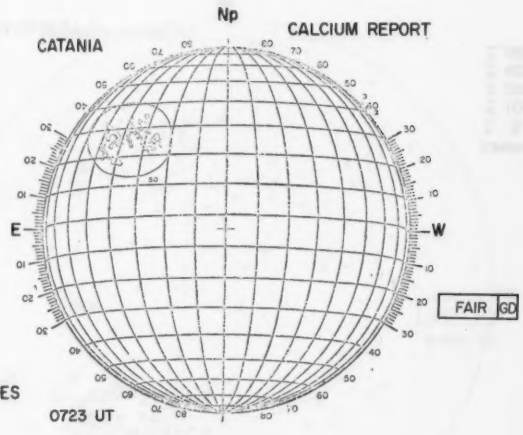
SUNSPOTS

PROMINENCES

1353 UT

CATANIA

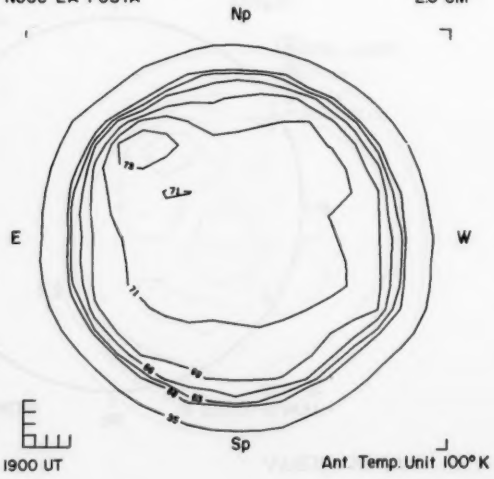
CALCIUM REPORT



0723 UT

NOSC LA POSTA

2.0 CM

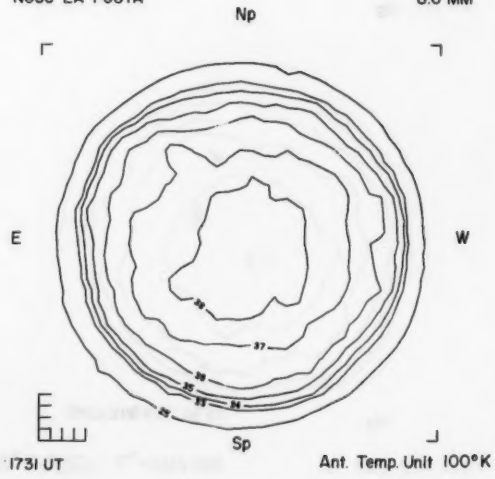


1900 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM



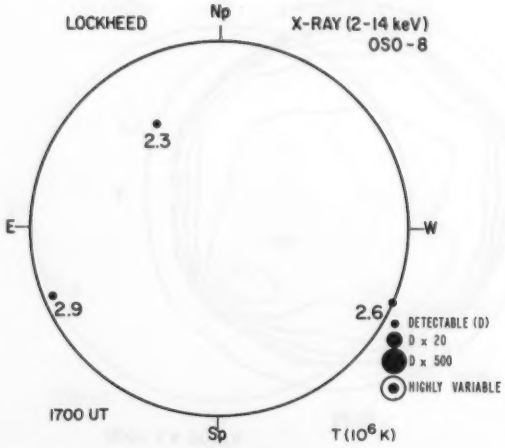
1731 UT

Ant. Temp. Unit 100°K

APRIL 26, 1977 (P =-24.99, B_o =-4.63, L_o =282.26)

LOCKHEED

X-RAY (2-14 keV)
OSO-8

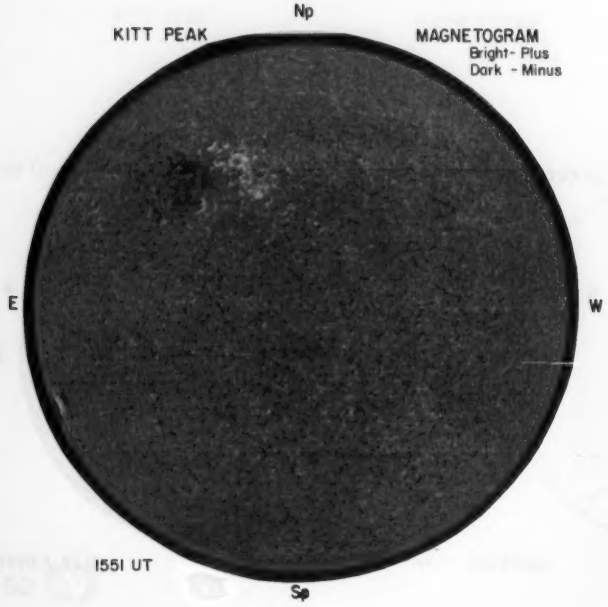


SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å

KITT PEAK

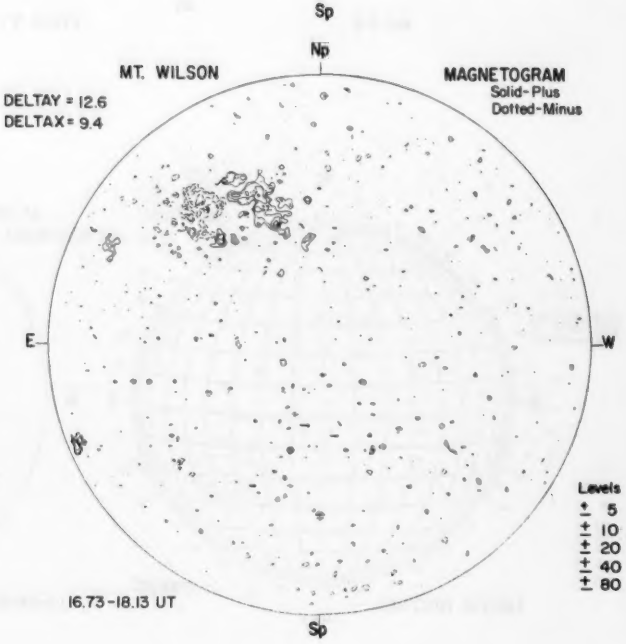
MAGNETOGRAM
Bright - Plus
Dark - Minus



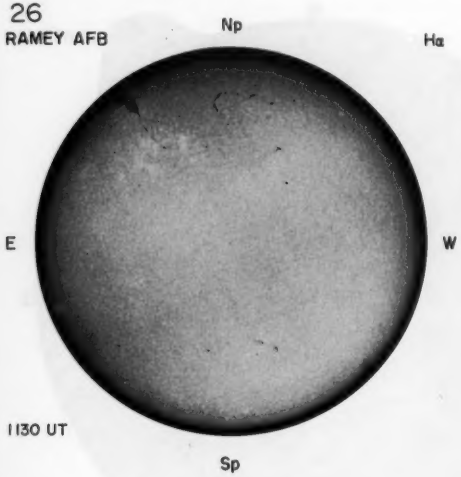
MT. WILSON

DELTAY = 12.6
DELTAX = 9.4

MAGNETOGRAM
Solid - Plus
Dotted - Minus



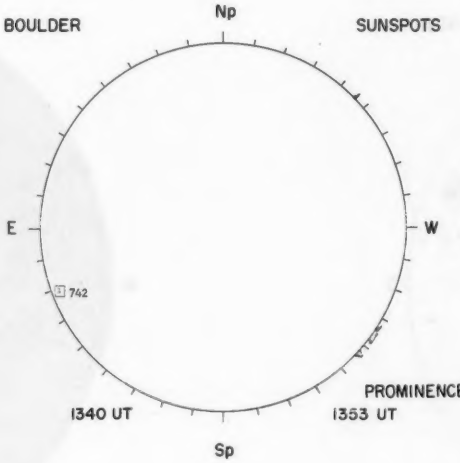
RAMEY AFB



1130 UT

Hα

BOULDER



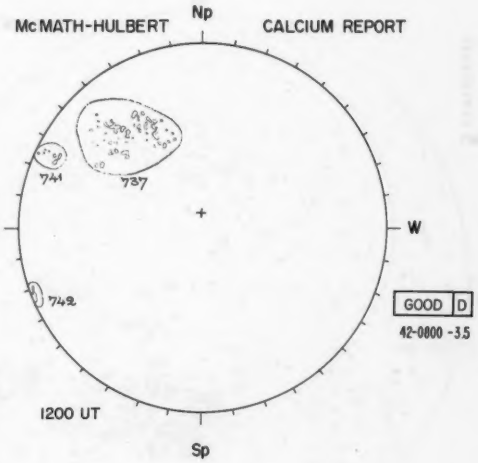
1340 UT

SUNSPOTS

PROMINENCES

1353 UT

McMATH-HULBERT



1200 UT

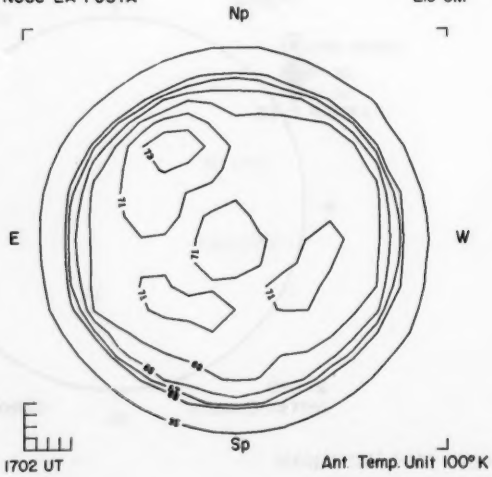
CALCIUM REPORT

GOOD D

42-0800 -3.5

NOSC LA POSTA

2.0 CM

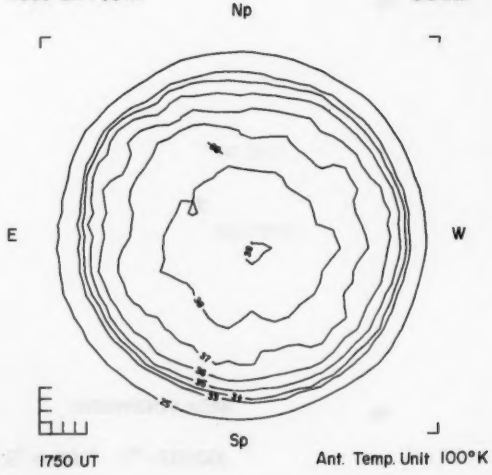


1702 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM



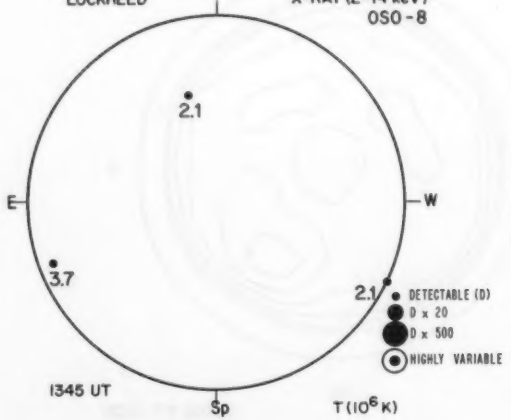
1750 UT

Ant. Temp. Unit 100°K

APRIL 27, 1977 (P =-24.85, B_o =-4.54, L_o =269.05)

LOCKHEED

X-RAY (2-14 keV)
OSO-8

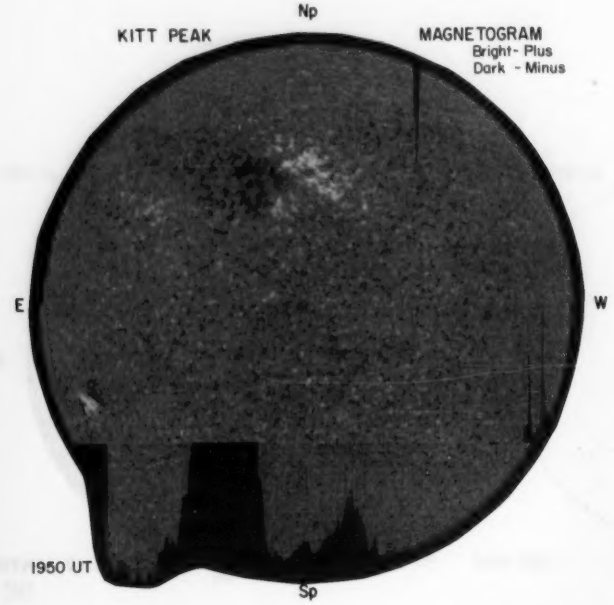


SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å

KITT PEAK

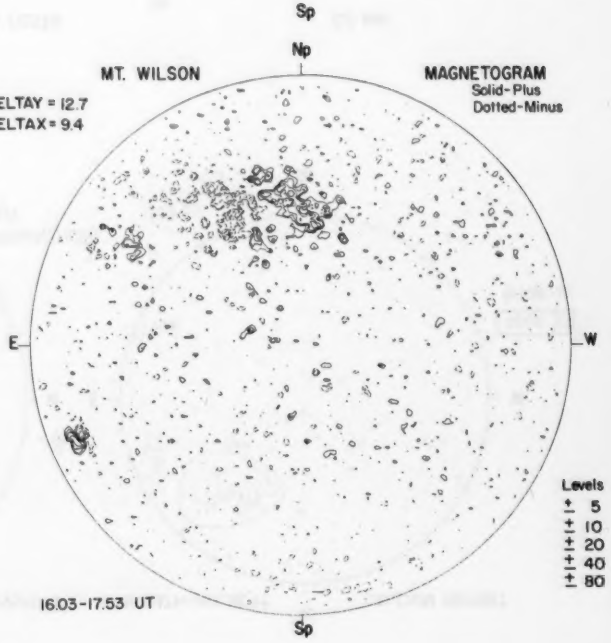
MAGNETOGRAM
Bright - Plus
Dark - Minus



MT. WILSON

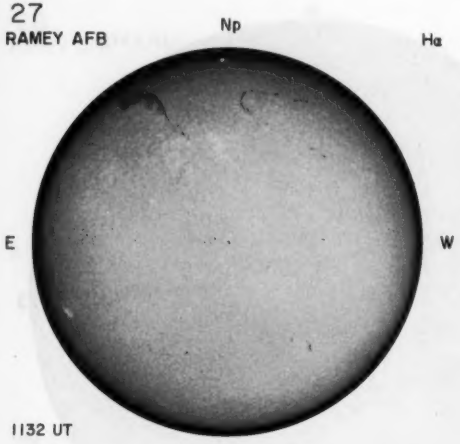
DELTAY = 12.7
DELTAX = 9.4

MAGNETOGRAM
Solid - Plus
Dotted - Minus



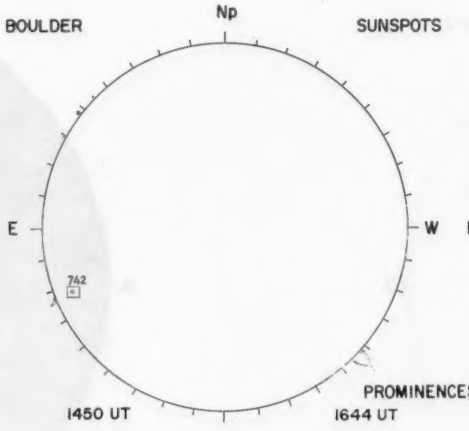
27

RAMEY AFB



1132 UT

Hα BOULDER



1450 UT

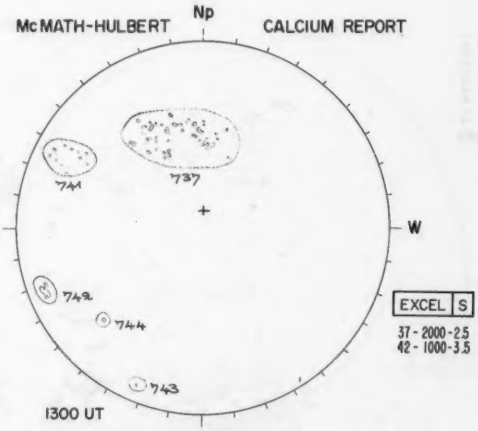
SUNSPOTS

PROMINENCES

1644 UT

McMATH-HULBERT

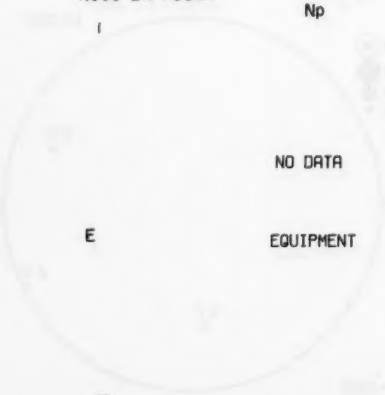
CALCIUM REPORT



1300 UT

NOSC LA POSTA

2.0 CM

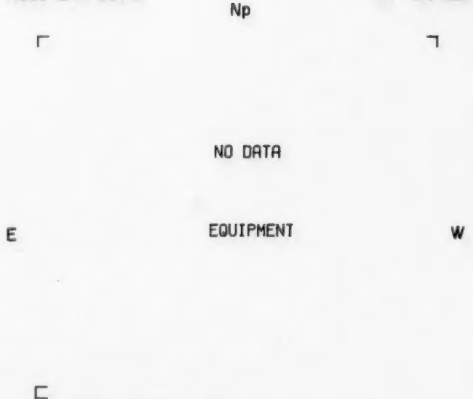


---- UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

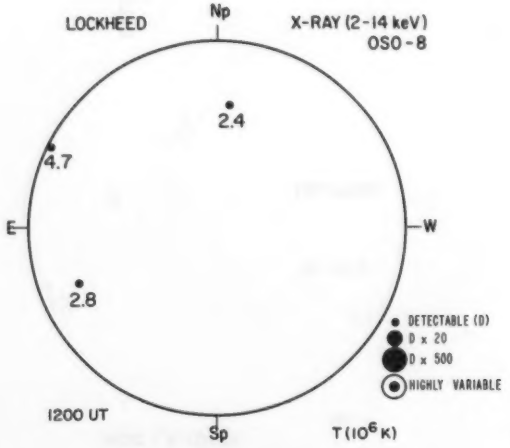


---- UT

Ant. Temp. Unit 100°K

APRIL 28, 1977 (P =-24.70, B_o =-4.44, L_o =255.84)

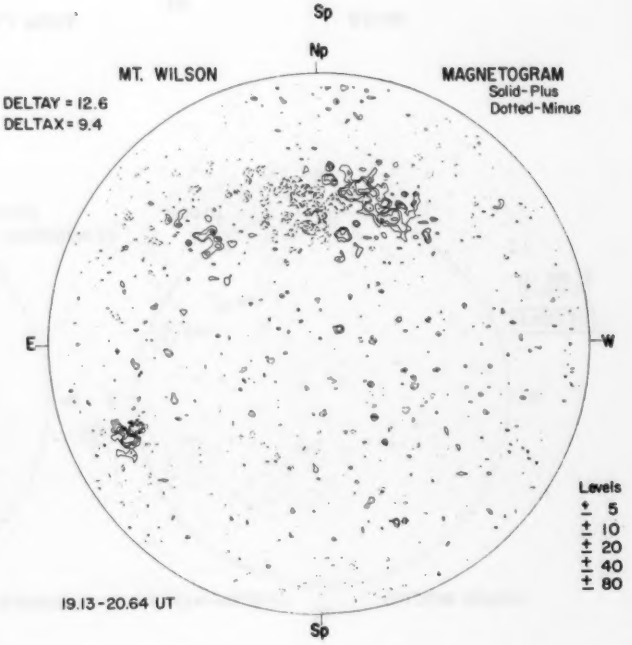
LOCKHEED



SACRAMENTO PEAK

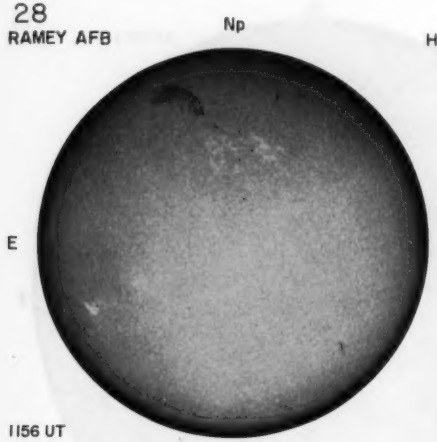
KITT PEAK

MT. WILSON



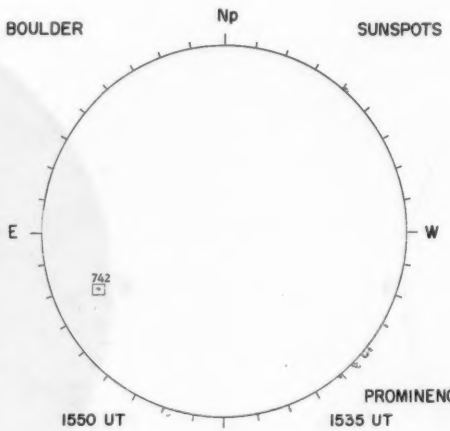
28

RAMEY AFB



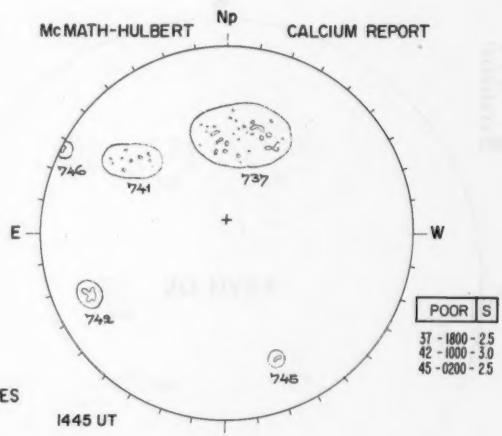
1156 UT

Hα BOULDER



1550 UT

SUNSPOTS



1535 UT

PROMINENCES

1445 UT

CALCIUM REPORT

POOR	S
37 - 1800 - 2.5	
42 - 1000 - 3.0	
45 - 0200 - 2.5	

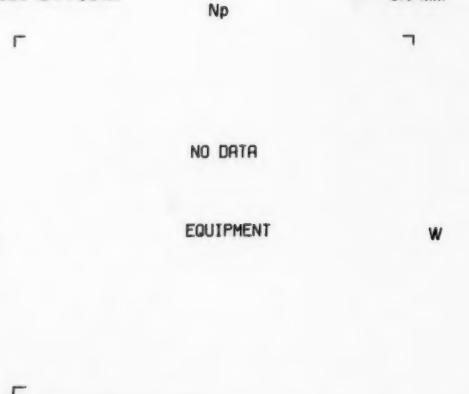
NOSC LA POSTA

2.0 CM

---- UT

Ant. Temp. Unit 100°K

NOSC LA POSTA



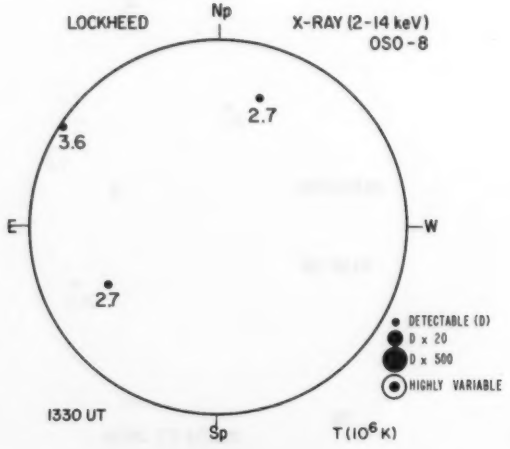
8.6 MM

----UT

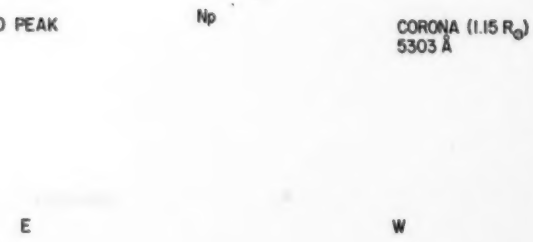
Ant. Temp. Unit 100°K

APRIL 29, 1977 (P =-24.54, B_o =-4.34, L_o =242.62)

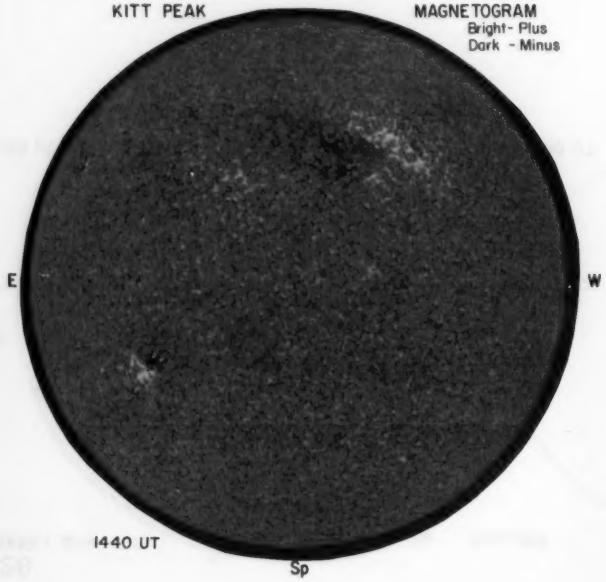
LOCKHEED X-RAY (2-14 keV) OSO-8



SACRAMENTO PEAK

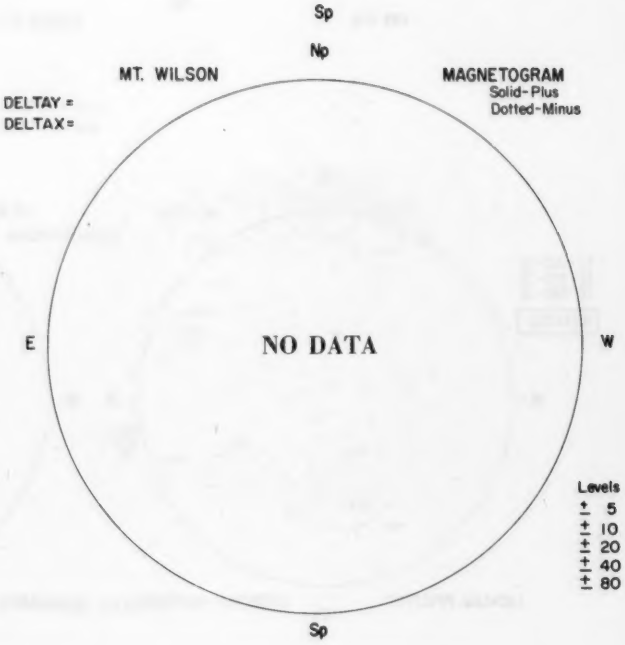


KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



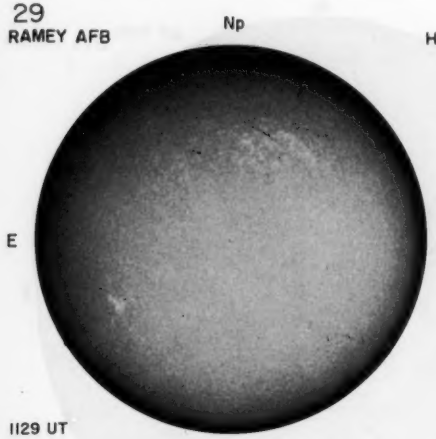
MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY =
DELTAX =



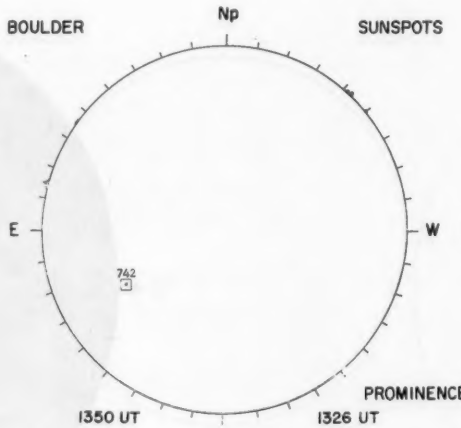
29

RAMEY AFB



1129 UT

Hα BOULDER



1350 UT

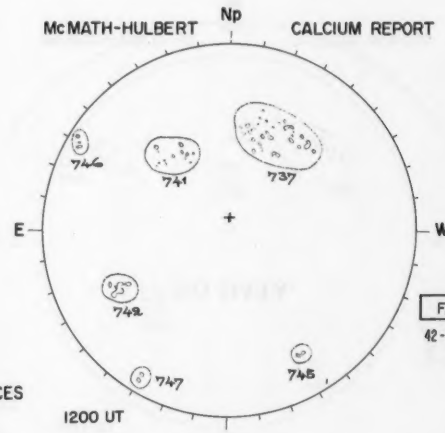
SUNSPOTS

1326 UT

PROMINENCES

McMATH-HULBERT

CALCIUM REPORT



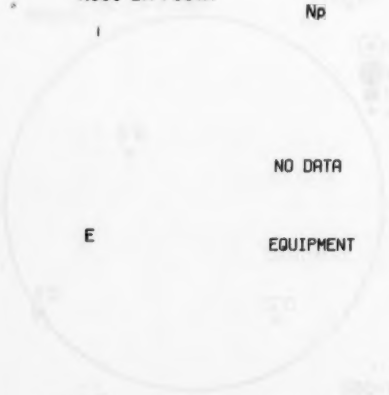
1200 UT

FAIR D

42-0800-30

NOSC LA POSTA

2.0 CM



----UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

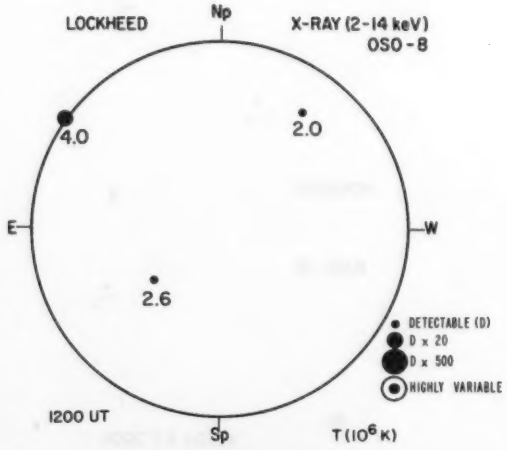
----UT

Ant. Temp. Unit 100°K

APRIL 30, 1977 (P =-24.37, B_o =-4.24, L_o =229.41)

LOCKHEED

X-RAY (2-14 keV)
OSO-8

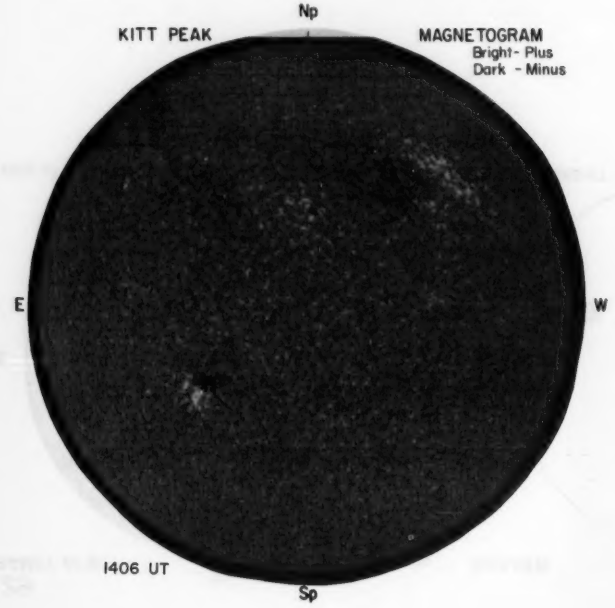


SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å

KITT PEAK

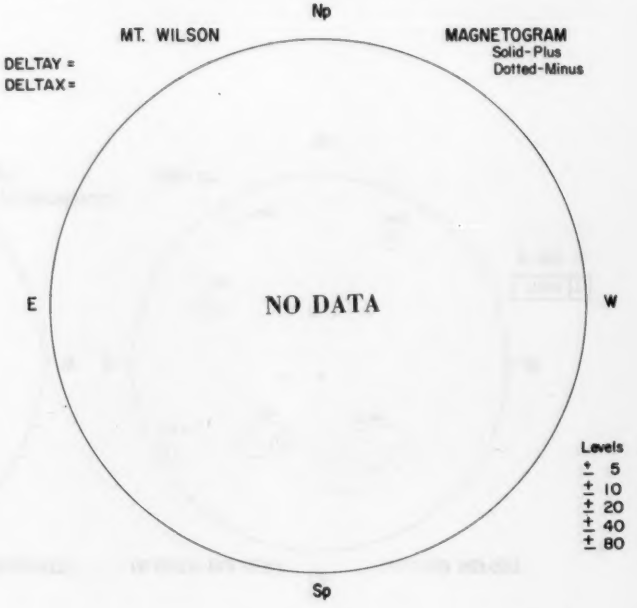
MAGNETOGRAM
Bright - Plus
Dark - Minus



MT. WILSON

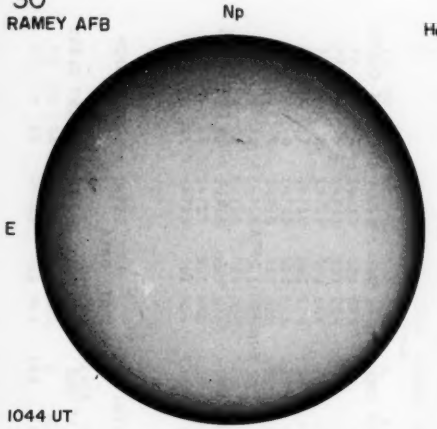
DELTAY =
DELTAX =

MAGNETOGRAM
Solid - Plus
Dotted - Minus



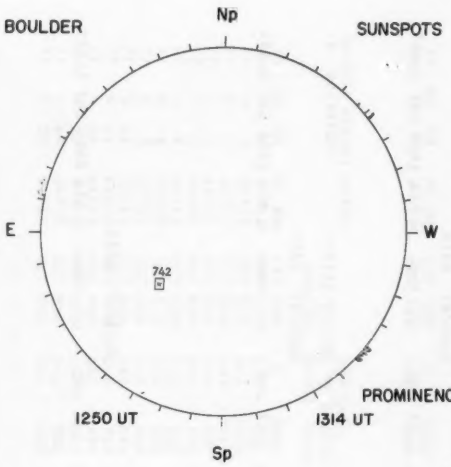
30

RAMEY AFB — Hα



1044 UT

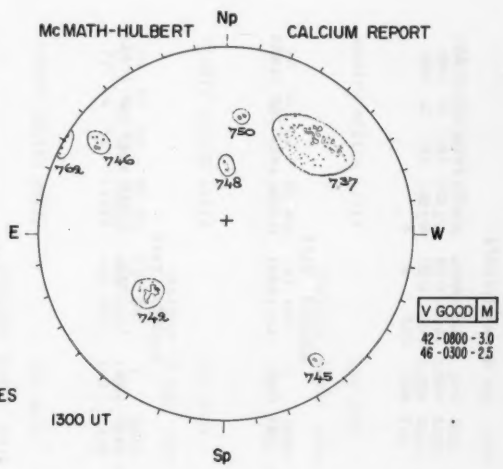
BOULDER — SUNSPOTS



1250 UT — 1314 UT

PROMINENCES

McMATH-HULBERT — CALCIUM REPORT



V GOOD | M

42 - 0800 - 3.0
46 - 0300 - 2.5

1300 UT

NOSC LA POSTA — 2.0 CM

Np

NO DATA

EQUIPMENT

E W

Sp

----UT

Ant. Temp. Unit 100°K

NOSC LA POSTA — 8.6 MM

Np

NO DATA

EQUIPMENT

E W

Sp

----UT

Ant. Temp. Unit 100°K

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MCMATH REGION 14717 CMP DATE 1.6

			CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	4	5	14717	N20 W53	244	100	3.0	19769	N18 W51	241	(B)	4	B	10	2	BXO
77	4	6	14717	N20 W66	245	400	3.0	19769	N18 W65	242	(B)	4	B	10	2	BXO
77	4	7	14717	N20 W82	245	500	2.0	19769	N18 W80	243	B	3				

MCMATH REGION 14706 CMP DATE 2.3

			CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	3	29	14706	N18 E50	234	100	1.0									

MCMATH REGION 14712 CMP DATE 2.6

			CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	4	2	14712	N17 W04	230	100	1.0									
77	4	3	14712	N17 W12	230	100	1.0									

MCMATH REGION 14709 CMP DATE 3.6

			CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	3	30	14709	N00 E46	225	100	1.5									

MCMATH REGION 14707 CMP DATE 3.9 RETURN OF REGION 14674 ROTATION 3

			CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	3	29	14707	N20 E73	211	400	1.0									
77	3	30	14707	N20 E59	212	300	1.0									
77	3	31	14707	N22 E43	212	300	1.5									

MCMATH REGION 14711 CMP DATE 4.1

			CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	4	1	14711	S15 E30	211	100	1.5									
77	4	2	14711	S15 E16	210	100	1.5									
77	4	3	14711	S15 E07	211	100	1.5									

MCMATH REGION 14710 CMP DATE 5.3

			CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	3	31	14710	S31 E59	196	200	2.5									

MCMATH REGION 14725 CMP DATE 5.5

			CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	4	11	14725	S21 W80	191	100	1.0									

MCMATH REGION 14714 CMP DATE 6.6

			CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	4	3	14714	N28 E40	178	200	2.0									
77	4	4	14714	N28 E27	178	200	1.0									

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MCMATH REGION 14719 CMP DATE 6.8

				CALCIUM PLAGE DATA				SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	4	8	14719	N29 W23	174	200	2.0	19770	N27 W24	174	(AF)	3	B	0	1	AXX
77	4	9	14719	N29 W36	174	100	1.0									

MCMATH REGION 14718 CMP DATE 7.2

				CALCIUM PLAGE DATA				SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	4	6	14718	S06 E09	170	100	2.0									

MCMATH REGION 14720 CMP DATE 8.7

				CALCIUM PLAGE DATA				SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	4	9	14720	N36 W11	149	100	2.0									
77	4	10	14720	N36 W23	149	100	1.5									

MCMATH REGION 14722 CMP DATE 9.4

				CALCIUM PLAGE DATA				SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	4	9	14722	S34 W02	140	100	1.0									

MCMATH REGION 14713 CMP DATE 9.5 RETURN OF REGION 14679 ROTATION 3

				CALCIUM PLAGE DATA				SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	4	2	14713	N27 E88	138	400	2.0									
77	4	3	14713	N27 E78	140	1000	2.0									
77	4	4	14713	N27 E66	139	1000	2.5									
77	4	5	14713	N28 E52	139	800	2.0									
77	4	6	14713	N27 E39	140	800	2.5									
77	4	7	14713	N27 E24	139	800	2.5									
77	4	8	14713	N27 E12	139	800	2.5									
77	4	9	14713	N27 W02	140	800	2.5									
77	4	10	14713	N27 W14	140	600	2.0									
77	4	11	14713	N27 W29	140	700	2.0									
77	4	12	14713	N27 W43	141	800	3.0	19772	N26 W43	140	(AF)	3				
77	4	13	14713	N27 W55	140	700	2.5									
77	4	14	14713	N27 W68	141	500	2.0									
77	4	15	14713	N27 W81	141	200	1.0									

MCMATH REGION 14715 CMP DATE 9.7

				CALCIUM PLAGE DATA				SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	4	3	14715	S01 E85	133	500	2.5									
77	4	4	14715	S01 E74	131	700	3.0									
77	4	5	14715	S01 E59	132	700	2.5									
77	4	6	14715	S01 E46	133	500	2.5									
77	4	7	14715	S01 E29	134	400	2.5									
77	4	8	14715	S01 E16	135	400	2.5									
77	4	9	14715	S01 E02	136	400	2.5									
77	4	10	14715	S01 W10	136	300	2.0									
77	4	11	14715	N00 W22	133	300	2.0									
77	4	12	14715	N00 W36	134	200	1.5									
77	4	13	14715	S01 W50	135	200	1.0									
77	4	14	14715	S01 W64	137	100	1.0									

MCMATH REGION 14729 CMP DATE 10.8

				CALCIUM PLAGE DATA				SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	4	15	14729	N20 W63	123	100	2.0	19774	N20 W65	123	X	1				

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MCMATH REGION 14721 CMP DATE 11.0

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	4	9	14721	N22 E19	119	100	2.0									
77	4	10	14721	N22 E06	120	100	1.5									
77	4	11	14721	N22 W08	119	100	1.5									
77	4	12	14721	N22 W21	119	100	1.0									

MCMATH REGION 14723 CMP DATE 13.0

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	4	9	14723	S36 E45	93	100	1.0									

MCMATH REGION 14732 CMP DATE 14.6

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	4	19	14732	S25 W66	72	300	2.0	19776	S26 W69	73	X	1				
77	4	20	14732	S25 W80	72	400	2.5									

MCMATH REGION 14728 CMP DATE 15.1

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	4	14	14728	N31 E08	65	100	1.0									

MCMATH REGION 14727 CMP DATE 15.5

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	4	14	14727	S25 E14	59	100	1.5	19773	S25 E11	60	AP	1				
77	4	15	14727	S25 E00	60	100	2.0	19773	S25 W04	62	(AP)	3	H	30	7	BXO
77	4	16	14727	S25 W15	60	400	2.5	19773	S25 W15	60	(BF)	4				
77	4	17	14727	S25 W26	59	500	2.5	19773	S26 W25	56	(BF)	4	B	20	4	BXO
77	4	18	14727	S25 W38	57	500	2.5	19773	S26 W39	57	(B)	3				
77	4	19	14727	S25 W52	56	400	2.5									
77	4	20	14727	S25 W66	58	400	2.5									
77	4	21	14727	S25 W79	60	300	2.0									

MCMATH REGION 14730 CMP DATE 16.4

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	4	16	14730	N24 W03	48	200	1.5	19775	N26 W05	50	(AP)	2				
77	4	17	14730	N25 W15	48	200	1.5									
77	4	18	14730	N26 W28	47	200	1.5									
77	4	19	14730	N27 W41	47	200	1.0									

MCMATH REGION 14724 CMP DATE 17.1

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	4	10	14724	N24 E58	38	100	1.0									
77	4	11	14724	N25 E72	39	300	1.0									
77	4	12	14724	N26 E60	38	100	1.0									

MCMATH REGION 14726 CMP DATE 18.7

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	4	11	14726	S21 E87	24	600	3.5	19771	S20 E80	31	(AP)	4	R	50	1	HSX
77	4	12	14726	S21 E77	21	3700	4.0	19771	S20 E72	25	(B)	4	H	220	5	DAO
77	4	13	14726	S22 E65	20	3500	3.5	19771	S20 E59	25	(Y)	4	B	300	16	DAI

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MCMATH REGION 14726 (CONT) CMP DATE 18.7

			CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	4	14	14726	S22 E54	19	3500	3.5	19771	S20 E46	25	(Y)	4	B	370	13	DAI
77	4	15	14726	S22 E41	19	3800	3.5	19771	S20 E33	25	(Y)	5				
77	4	16	14726	S22 E27	18	3800	3.5	19771	S20 E20	25	(Y)	5	B	300	9	DAI
77	4	17	14726	S22 E15	18	3200	3.0	19771	S19 E07	24	(Y)	4	B	170	19	EAI
77	4	18	14726	S22 E02	17	3200	3.5	19771	S20 W05	23	(Y)	5				
77	4	19	14726	S22 W12	18	3300	3.5	19771	S20 W16	20	(BP)	5	H	140	3	DSO
77	4	20	14726	S22 W26	18	3000	3.5	19771	S20 W33	24	(BY)	5	H	120	9	EAO
77	4	21	14726	S21 W40	21	3000	3.5	19771	S22 W39	20	(BP)	3	B	100	7	CSI
77	4	22	14726					19771	S22 W55	19	BP	3	B	100	7	CSO
77	4		14726						S12 E02				B	0	1	AXX
77	4	23	14726					19771	S22 W65	19	(B)	2	B	100	10	CAI
77	4	24	14726	S22 W75	15	1500	3.5	19771	S20 W88	29	(AP)	2	B	30	2	BXO

MCMATH REGION 14731 CMP DATE 19.3

			CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	4	18	14731	N09 E10	9	200	1.5									

MCMATH REGION 14739 CMP DATE 22.8

			CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	4	24	14739	N05 W24	324	100	2.0									

MCMATH REGION 14740 CMP DATE 23.8

			CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	4	24	14740	S22 W11	311	100	1.5									

MCMATH REGION 14735 CMP DATE 24.5

			CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	4	21	14735	N29 E39	302	200	1.0									

MCMATH REGION 14745 CMP DATE 26.9

			CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	4	28	14745	S46 W23	270	200	2.5									
77	4	29	14745	S45 W33	269	200	1.5									
77	4	30	14745	S45 W44	266	100	1.0									

MCMATH REGION 14736 CMP DATE 27.1

			CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	4	21	14736	N15 E73	268	100	1.0									

MCMATH REGION 14752 CMP DATE 27.5

			CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	5	02	14752	N01 W68		300	1.0									
77	5	03	14752	N02 W80		200	1.0									

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MCMATH REGION 14756 CMP DATE 28.0

			CALCIUM	PLAGE	DATA		SUNSPOT	DATA					
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H STA	AREA	CNT CLASS
77	5	03	14756	S27 W72		300	1.5							

MCMATH REGION 14737 CMP DATE 28.3 RETURN OF REGION 14717 ROTATION 2

			CALCIUM	PLAGE	DATA		SUNSPOT	DATA					
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H STA	AREA	CNT CLASS
77	4	21	14737	N27 E69	252	700	1.0							
77	4	24	14737	N27 E45	255	1800	2.0							
77	4	25	14737						S21 E85			H	90	1 HSX
77	4	26	14737	N27 E23	253	1600	2.0							
77	4	27	14737	N26 E13	251	2000	2.5							
77	4	28	14737	N27 W04	251	1800	2.5							
77	4	29	14737	N27 W17	253	1800	2.0							
77	4	30	14737	N27 W30	252	1800	2.0							
77	5	01	14737	N27 W41		1800	2.0							
77	5	02	14737	N27 W54		1800	2.0							
77	5	03	14737	N27 W65		1400	1.5							

MCMATH REGION 14757 CMP DATE 28.4

			CALCIUM	PLAGE	DATA		SUNSPOT	DATA					
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H STA	AREA	CNT CLASS
77	5	03	14757	N08 W53		100	1.5							

MCMATH REGION 14750 CMP DATE 30.2

			CALCIUM	PLAGE	DATA		SUNSPOT	DATA					
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H STA	AREA	CNT CLASS
77	4	30	14750	N34 W04	226	100	1.0							
77	5	01	14750	N34 W16		100	1.5							
77	5	02	14750	N34 W32		200	1.0							

MCMATH REGION 14748 CMP DATE 30.5

			CALCIUM	PLAGE	DATA		SUNSPOT	DATA					
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H STA	AREA	CNT CLASS
77	4	30	14748	N19 W01	223	200	2.0	19778	N17 W02	223	X	2		
77	5	01	14748	N19 W13		300	1.5							
77	5	03	14748	N19 W37		200	1.0							

MCMATH REGION 14744 CMP DATE 30.6

			CALCIUM	PLAGE	DATA		SUNSPOT	DATA					
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H STA	AREA	CNT CLASS
77	4	27	14744	S34 E40	221	100	1.5							

MCMATH REGION 14753 CMP DATE 30.9

			CALCIUM	PLAGE	DATA		SUNSPOT	DATA					
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H STA	AREA	CNT CLASS
77	5	02	14753	S01 W24		100	1.0							

Note: No calcium spectroheliograms were secured at the McMath-Hulbert Observatory on April 22, 23 and 25, 1977. Sunspot observations were made at Mt. Wilson for the entire month of April 1977.

DAILY CALCIUM PLAGE INDEX

APRIL 1977

YR	MO	DAY	INDEX	YR	MO	DAY	INDEX	YR	MO	DAY	INDEX
77	4	1	5.7	77	4	11	1.9	77	4	21	7.7
77	4	2	5.3	77	4	12	4.6	77	4	22	*
77	4	3	5.4	77	4	13	5.5	77	4	23	*
77	4	4	4.8	77	4	14	7.0	77	4	24	3.6
77	4	5	3.8	77	4	15	9.4	77	4	25	*
77	4	6	3.7	77	4	16	12.1	77	4	26	3.7
77	4	7	2.6	77	4	17	9.9	77	4	27	6.1
77	4	8	3.0	77	4	18	11.8	77	4	28	6.4
77	4	9	3.3	77	4	19	11.3	77	4	29	5.8
77	4	10	1.9	77	4	20	9.2	77	4	30	5.7

* NO OBSERVATIONS

SUDDEN IONOSPHERIC DISTURBANCES

APRIL 1977

DAY	UNIVERSAL TIME START	END	MAX	IMP	WIDE SPREAD INDEX	NUMBER OF STATION REPORTS BY TYPE SWF	SCNA	SEA	SPA	LF-SPA	SES	SFD	KNOWN FLARE	McMATH REGION
07	0250	0333	0310	1-	1				1				0246	14717
11	2115	2302	2128	1	5	1		1	2		9		NF	
12	0948	1100	0954	3-	5	6		4	3		3		0944	14726
13	1232	1304	1300	1	1			1					1227	14726
13	1730	1757D	1757	1	5	3			2	1	10		1727E	14726
13	2126	2207D	2137	1	5	3		1	2	1	10		2130	14726
13	2207E	2333D	2221	1	5	2		1	2	1			2218E	14726
13	2233E	0203	2344	2	5	2		1	2	1	10		2234	14726
14	0534	0640	0543	2+	5	3		3	2		3		NF	
14	2112	2118	2114	1-	5	1			1		4		2105	14726
14	2211	2235	2214	1-	5				1		4		2211	14726
15	0854	0945	0904	1+	5	3		3	3		2		0851	14726
16	0712	0834	0746	1-	1				1				0711	14726
16	1727	1815	1733	1	5	2			1	1	10		1722	14726
16	2109	2216	2120	1-	5	1		1	2	1	11		2109	14726
16	2309	0218	2330	1	5	1			3	1	8		2307	14726
17	1042	1140	1056	1	5	2		3	3		2		1040	14726
19	0739	0816	0745	1-	5			2	2		1		0735	14726
19	1209	1228	1210	1	1			1					*	
19	1503	1600	1525	1	1			1	1				*	

PERIODS OF NO OBSERVATIONS:

DATE	TIME (UT) and STATION
01-14	0000-2400 A29
01-10	0000-2400 A32
01-05	0000-2400 A36
01-03	0000-2400 A41
01	2025-2115 UM (10 kHz), 2307-2400 UM (10 kHz)
02	0025-0125 UM (10 kHz), 0857-0950 UM (10 kHz), 0857-0950 UM (13 kHz)
04	0435-0520 UM (10 kHz), 1942-2108 UM (10 kHz)
05	1939-2110 UM (10 kHz)
06	0121-0219 UM (10 kHz), 1945-2109 UM (10 kHz)
07-12	0000-2400 A37
07	1951-2123 UM (10 kHz)
08	0000-0055 UM (10 kHz), 0510-0625 UM (10 kHz)
09	0000-2400 A41, 1626-1845 TM, 1948-2022 UM (10 kHz)
10-18	0000-2400 A28
10	0000-2400 A41, 1950-2103 UM (10 kHz)
11	0202-0330 UM (10 kHz), 0536-0631 UM (10 kHz)
12	0511-0644 UM (10 kHz), 1943-2104 UM (10 kHz)
13-30	0000-2400 A36
13	0317-0635 UM (10 kHz)
14	0042-0152 UM (10 kHz), 0213-0442 UM (10 kHz)
	1940-2115 UM (10 kHz)
15	1941-2037 UM (10 kHz)
16	0132-0623 UM (10 kHz), 1945-2105 UM (10 kHz)
17	1940-2101 UM (10 kHz), 2003-2110 UM (13 kHz)
18	1938-2039 UM (10 kHz)
19	1424-1526 TM, 2156-2236 TM
20	0000-0057 TM, 1432-1504 TM, 1643-1816 TM
21	1107-2235 UM (10 kHz), 1110-2235 UM (13 kHz)
22-25	1430-1143 MC
22	0000-2400 A32, 1109-2400 UM (10 kHz), 1111-2400 UM (13 kHz)
23	0000-0139 UM (10 kHz), 0000-0245 UM (13 kHz), 0841-0955 UM (13 kHz), 1136-2116 UM (10 kHz), 1140-2250 UM (13 kHz)
24	0000-2400 A41, 1107-2303 UM (10 kHz), 1107-2303 UM (13 kHz)
25	1222-1447 UM (10 kHz), 1225-1445 UM (13 kHz)
27	0000-2400 A32, 0710-0810 UM (10 kHz)
30	0000-2400 A26, 1835-2400 UM (10 kHz), 1839-2400 UM (13 kHz)

STATIONS REPORTING FOR APRIL 1977

AAVSO (A1, A19, A21, A29, A30, A31, A34, A35, A36, A37, A40, A41) (SES)
(A1, A26, A31, A32) (SEA) (A31) (SWF)
BEARLY (BY) (SWF)
DARMSTADT (DA) (SWF)
HERSTMONCEUX (HC) (SEA)
HIRAISO (HI) (SWF)
HOBART (TA) (SEA, SES)
HUANCAYO (HU) (SWF)
INUBO (IN) (SPA)
KUHLUNGSBORN (KU) (SWF, SEA, SPA)
MANILA (MA) (SPA)
MCMATH (MC) (SWF, SCNA)
PANSKA VES (PU) (SWF, SEA, SES)
SAO PAULO (UM) (SES, SPA)
SOFIA (SF) (SES)
SOMERTON (SO) (SWF)
ST CLOUD (SC) (SES)
TABLE MOUNTAIN (TM) (SPA, LF-SPA)
TORINO (TN) (SPA)
(TYCE (UT) (SPA)

SID's BY McMATH REGION

APRIL 1977

DAY	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
REGION 17								1				1	5	2	1	4	1		1											
26																														
X-RAY																														
UNKNOWN											1			1																
NO FF																			2											

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

APRIL 1977

APR 1977	TIMES OF OBSERVATION START UT	TIMES OF OBSERVATION END UT	STATION	EVENTS DECIMETRIC BAND START UT	DECIMETRIC BAND END UT	DECIMETRIC BAND INT	METRIC BAND START UT	METRIC BAND END UT	METRIC BAND INT	DEKAMETRIC BAND START UT	DEKAMETRIC BAND END UT	DEKAMETRIC BAND INT	SPECTRAL TYPE
01	0000	0736	CULG										
	0000	1005	MANI										
	0530	0546	DURN										
	0537	1715	WEIS										
	0629	1738	DURN										
	1030	2305	SGMR										
	1315	2345	HARV										
	2036	2400	CULG										
	2153	2400	MANI										
02	0000	1005	MANI										
	0000	0736	CULG										
	0529	1740	DURN										
	1028	2220	SGMR							1415.2	1416.5	1	V
			SGMR							1826.9	1827.3	1	III
	1315	2345	HARV				1827	1828	3	1827	1828	3	IIIG,U
	2036	2400	CULG										
	2153	2400	MANI										
03	0000	1005	MANI										
	0000	0735	CULG				0140.5		1				IIIB
	0528	1742	DURN										
	1026	2308	SGMR										
	1057	1718	WEIS				1413.7	1414.0	1				IIIG
	2035	2400	CULG				2048.5						IIIB,W
			CULG				2139.5						IIIB,W
			CULG				2145	2150	1				IS
			CULG	2152.5	2156	1	2152.5	2156	1				IIIG
	2152	2400	MANI										
	1315	2345	HARV				2153		1	2153		1	IIIB
	2035	2400	CULG				2249.5	2250.5	1				IIIB
			CULG				2315	2316					IIIG,W
04	0000	0717	CULG										
	0000	0134	MANI										
	0148	1005	MANI										
	0526	1743	DURN										
	1025	2309	SGMR										
	0531	1719	WEIS				1213.7	1214.4	1				IIIB
	1315	2345	HARV										
	2035	2400	CULG										
	2151	2400	MANI										
05	0000	1005	MANI										
	0000	0734	CULG				0031						IIIB,W
	0527	1509	DURN										
	0528	0808	WEIS										
	0811	1721	WEIS										
	1300	2345	HARV										
	1300	2310	SGMR										
	2035	2400	CULG										
	2151	2400	MANI										
06	0000	1005	MANI										
	0000	0734	CULG										
	0528	1308	WEIS										
	0554	1746	DURN										
	1021	2311	SGMR										
	1300	2345	HARV										
	1337	1558	WEIS										
	1602	1722	WEIS										
	2035	2400	CULG										
	2151	2400	MANI										
07	0000	1005	MANI										
	0000	0734	CULG										
	0523	1749	DURN										
	0525	1723	WEIS										
	1019	2312	SGMR										
	1300	2345	HARV										

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

APRIL 1977

APR 1977	TIMES OF OBSERVATION START UT	TIMES OF OBSERVATION END UT	STATION	EVENTS DECIMETRIC BAND START UT	DECIMETRIC BAND END UT	DECIMETRIC BAND INT	METRIC BAND START UT	METRIC BAND END UT	METRIC BAND INT	DEKAMETRIC BAND START UT	DEKAMETRIC BAND END UT	DEKAMETRIC BAND INT	SPECTRAL TYPE
07	2034	2400	CULG										
	2153	2400	MANI										
08	0000	1005	MANI										
	0523	0933	MEIS				0605.2	0605.7	2				IIIG
	0000	0734	CULG				0605	0606	1				IIIG,V
			CULG				0608	0612					IIW
			CULG				0622.5						IIIB,W
			CULG				0638						IIIB,W
	0521	1750	DURN				0851.0	0852.1	1				III
	0937	1015	MEIS										
	1018	2313	SGMR										
	1054	1725	MEIS										
	1300	2345	HARV										
	2034	2400	CULG										
	2152	2400	MANI										
09	0000	1005	MANI										
	0520	1752	DURN										
	0000	0733	CULG				0530.5						IIIB,W
			CULG				0545.5	0546					IIIG,W
	0615	0727	MEIS										
	0924	1640	MEIS										
	1016	2314	SGMR										
	1300	2345	HARV										
	2035	2400	CULG										
	2152	2400	MANI										
10	0000	1005	MANI										
	0000	0733	CULG										
	0518	0850	DURN										
	1014	2315	SGMR										
	1019	1753	DURN										
	1300	2345	HARV										
	2033	2400	CULG										
	2152	2400	MANI										
11	0000	0401	MANI										
	0000	0733	CULG										
	0605	1005	MANI										
	0515	1755	DURN	0948.4	0948.6	1							IIIG
	1013	2317	SGMR										
	1300	2345	HARV										
	2033	2400	CULG										
	2152	2400	MANI										
12	0000	1005	MANI										
	0000	0732	CULG										
	0513	1757	DURN	0949	0955.5	3							DCIM
			DURN	0952.6	0952.9	3							IIIG,RS,U
			DURN	0958	1005.2	3	0959	1005.2	3				IC
	1011	2318	SGMR										
			DURN	1020.9	1022.6	2	1020.9	1022.6	3				IC
	1300	2345	HARV										
	2033	2400	CULG										
	2146	2400	MANI										
13	0000	1005	MANI										
	0000	0732	CULG										
	0512	1758	DURN	0550.3	0551	2							IIIG
	0715	0758	DWIN										
	1009	2319	SGMR										
	0836	1308	DWIN				1018.0	1018.5	1				IIIG
			DWIN				1056.8	1058.2	1				IIIG
			DWIN				1210.0	1212.2	1				IIIGG
			DWIN				1248.7	1248.8	1				IIIG
	1300	2345	HARV				1444		2	1444		2	IIIG
			HARV				1841		1	1841		1	IIIB
	2033	2400	CULG				2033	2115					IIIS,W
	2146	2400	MANI										

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

APRIL 1977

APR 1977	TIMES OF OBSERVATION START UT	TIMES OF OBSERVATION END UT	STATION	EVENTS DECIMETRIC BAND START UT	DECIMETRIC BAND END UT	DECIMETRIC BAND INT	METRIC BAND START UT	METRIC BAND END UT	METRIC BAND INT	DEKAMETRIC BAND START UT	DEKAMETRIC BAND END UT	DEKAMETRIC BAND INT	SPECTRAL TYPE
14	0000	1005	MANI										
	0000	0732	CULG				0057	0058					IIIG,W
			CULG				0249	0249.5					IIIG,W
			CULG							0542	0605	1	SWF
	0549	1354	DURN	0548.5	0548.9								DCIM,W
			CULG	0554	0557	1							FAST DRIFT
			DURN	0555.8	0556.3	3	0555.6	0556.3	3				IIIG
			CULG				0557	0650					IIIN,W
			CULG				0600	0635	1				CONT
			CULG				0610	0623	1				UNCLF.
	0701	1454	OWIN				0956.6						IIIB
			OWIN				1001.0		1				IIIB
	1008	2320	SGMR										
			OWIN				1159.4	1159.6	1				IIIG
			OWIN				1218.1	1218.5	1				IIIG
	1343	1733	WEIS										
	1300	2345	HARV				1802		1	1802		1	IIIB
			HARV				1820		1	1820		1	IIIB
	2033	2400	CULG				2045	2400					IIIN,W
			CULG				2106		1				IIIB,U
	2146	2400	MANI										
15	0000	1005	MANI										
	0000	0732	CULG				0049.5		1				IIIB
			CULG				0059.5		1				IIIB
	0510	1734	WEIS										
	0735	1419	OWIN				0735	1419	1				IN
	1300	2345	HARV				1739		2	1739		2	IIIG
	0507	1759	DURN	1741.5	1741.9		1741.5	1741.9					IIIG,W
	1006	2321	SGMR							1821.7	1821.9	1	III
			HARV				1821	1822	3	1821	1822	3	IIIG
			SGMR							1911.8	1912.3	2	V
			HARV				1912		3	1912		3	IIIG,V
			SGMR							1919.7	1920.1	2	V
			HARV				1920		3	1920		3	IIIG
	2032	2400	CULG				2032	2400					IIIN,W
			CULG				2052.5		2				IIIB
			HARV				2052	2053	2	2052	2053	2	IIIG
	2145	2400	MANI										
			CULG				2155	2156.5	1				IIIG
			CULG				2219.5	2220.5	2				IIIG
			HARV				2220		1	2220		1	IIIB,W
			CULG				2302	2302.5	1				IIIG
			CULG				2320.5	2321	2				IIIG
			HARV				2320		1	2320		1	IIIG,W
16	0000	0732	CULG				0000	0224	1				IIIN
			CULG				0003.5	0006	2				IIIGG
			CULG				0011	0012	2				IIIG
			CULG				0016	0018	2	0017	0017.5	1	IIIG
			CULG				0200.5	0201	2				IIIG
			CULG				0210.5	0211	2	0210.5	0211	2	IIIG
	0000	1005	MANI							0210.9	0211.3	2	III
	0508	1829	WEIS				0544.5	0545.5	2				IIIG
	0506	1800	DURN	0544.6	0545.5	1	0544.6	0545.2	2				IIIG
			CULG	0545	0545.5	1	0544.5	0546	1				IIIG
			DURN	0724	1450	1	0724	1450	1				IC,DC,N
			DURN	0729.7	0731.0	1	0729.7	0731.0	1				IIIG
			DURN				0851.2	0851.2	3				III
	1005	2322	SGMR										
			WEIS				1132.0	1548.0	2				IN
	1300	2345	HARV										
	2032	2400	CULG				2032	2400					IS,W
	2146	2400	MANI										
			CULG							2310	2330	1	S.W.F.
			CULG	2312	2321	1							CONT
			CULG				2318	2400					IIIN,W
			CULG				2318	2335					II, W
			CULG	2320	2325		2318	2327					IIIG,W
17	0000	0731	CULG				0000	0135	1				IS

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

APRIL 1977

APR 1977	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
17			CULG				0000	0148					IIIN,W
	0000	1005	MANI										
			CULG	0040	0105								IS,W
			CULG				0135	0731					IS,W
	0505	1800	DURN										
	0506	1737	WEIS										
	1003	2323	SGMR										
	1300	2345	HARV										
	2031	2400	CULG				2102						IIIB,W
	2145	2400	MANI										
			CULG				2207	2209					IIIG,W
			CULG	2210	2212.5	1							IIIG
			CULG				2216	2217					IIIG,W
			CULG				2223	2224	1				IIIG
			CULG				2234	2239	1				IIIGG
			CULG				2337		2				IIIB
18	0000	1006	MANI										
	0000	0731	CULG				0013	0014	1				IIIG
			CULG				0240	0252	1				IIIG
			CULG				0303		1				IIIB
			CULG				0317		1				UNCLF.
			CULG				0346						IIIB,W
	0504	0558	WEIS										
	0504	1802	DURN										
	0715	1538	WEIS										
	1001	2324	SGMR										
	1300	2345	HARV										
	2143	2400	MANI										
	2031	2400	CULG				2231	2234.5	2				IIIG
			CULG				2258		1				IIIB
			CULG				2354.5						IIIB,W
19	0000	0731	CULG										
	0000	1006	MANI										
	0503	1439	WEIS										
	0503	0606	DURN										
	0618	1804	DURN										
	1000	2326	SGMR										
	0745	1435	DWIN				1022.4	1022.5	1				IIIG
	1300	2300	HARV										
	2032	2400	CULG										
	2143	2400	MANI										
20	0000	1006	MANI										
	0000	0731	CULG				0540.5	0542	1				IIIG
			CULG				0549.5	0551.5					IIIG,W
	0500	1740	WEIS				0824.8	0825.3	1				IIIG
	0501	1805	DURN				0825.2	0825.3	2				IIIG
	0958	2327	SGMR										
	0829	1343	DWIN				1049.0	1051.0	2				IIIG
	1300	2330	HARV										
	2031	2400	CULG										
	2143	2400	MANI										
21	0000	1006	MANI										
	0000	0730	CULG	0004	0004.5	1							IIIG
			CULG	0257	0257.5	1							IIIG,U
			CULG	0325	0325.5	1	0325	0325.5	1				IIIG
			CULG				0332						IIIB,W
			CULG	0409.5	0411	1							IIIG
			CULG	0411.5		1	0411.5		1				IIIB
			CULG	0630.5	0631.5	1							IIIG
	0500	1806	DURN	0630.8	0634.9	3	0630.8	0634.9	3				IIIG
	0459	0931	WEIS	0630.9	0631.6	2							IIIG
			WEIS				0634.8	0634.9	1				IIIB
			CULG	0635									IIIB,W
			CULG	0643.5									IIIB,W
			WEIS				0648.3	0648.5	1				IIIB
			CULG	0648.5									IIIB,W

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

APRIL 1977

APR 1977	TIMES OF OBSERVATION START UT	TIMES OF OBSERVATION END UT	STATION	EVENTS DECIMETRIC BAND START UT	DECIMETRIC BAND END UT	DECIMETRIC BAND INT	METRIC BAND START UT	METRIC BAND END UT	METRIC BAND INT	DEKAMETRIC BAND START UT	DEKAMETRIC BAND END UT	DEKAMETRIC BAND INT	SPECTRAL TYPE
21	0841	1406	DWIN				1043.5	1044.2	3				IIIG
			DURN	1043.6	1043.8	2	1043.5	1043.9	3				IIIG
			DWIN				1203.9	1204.0	1				IIIG
			DWIN				1246.0		1				IIIB
			DWIN				1306.6	1306.7	1				IIIG
	0934	1742	WEIS				1343.5	1344.4	2				IIIG
			DURN	1348.8	1351.2	3	1350.6	1351.2	3				IIIG
			DWIN				1349.5	1350.0	1				IIIG
			DWIN				1350.6	1351.3	3				IIIG
			DWIN				1355.6	1356.3	2				IIIG
			DURN	1537.3	1538.2	3	1537.6	1538.2	3				IIIGG,U
			WEIS				1538.0	1538.5	3				IIIG
	0957	2328	SGMR							1538.2	1538.4	1	III
	1300	2330	HARV				1538		2	1538		2	IIIG,U
			WEIS				1539.7	1539.8	1				IIIG
			WEIS				1543.3	1547.0	2			II	
			HARV				1544	1545	1				UNCL
			DURN	1629.2	1629.8		1629.7	1629.7					IIIG,DCIMW
	2031	2400	CULG	2037.5	2038	1	2037.5	2038	1				IIIG,U
			CULG				2040	2042	1				IIIG,U
			CULG	2040	2042	1							FAST DRIFT
			CULG	2047	2047.5		2047	2047.5					IIIG,W
	2143	2400	MANI										
			CULG	2149.5		1							IIIB
			CULG	2200.5	2202								IIIG,W
			CULG	2205.5	2208	1							IIIG
			CULG	2216.5	2221.5	1	2216.5	2221.5	2				IIIGG
			HARV				2219		1				IIIG
			CULG				2229	2235	1			II	
			CULG	2249	2251	1	2249	2251	1				IIIG
			CULG	2252	2252.5	1	2252	2252.5	1				IIIG
			CULG	2254.5	2255	1	2254.5	2255	1				IIIG
			CULG	2257.5	2258	1	2257.5	2258	1				IIIG
			CULG				2302	2302.5	1				IIIG
			CULG				2313.5						IIIB,W
			CULG	2315	2316	1	2315	2316	1				IIIG
			CULG	2358	2359	1	2358.5	2359	1				IIIG
22	0000	1006	MANI										
	0000	0730	CULG	0041.5		1	0041.5		1				IIIB
	0752	1342	DWIN				0857.5	0857.8	2				IIIG
			DWIN				0938.4	0938.9	1				IIIG
			DWIN				0941.1	0941.2	1				IIIG
			DWIN				0943.9	0944.0	1				IIIG
	0955	2329	SGMR										
	0752	1342	DWIN				1029.4	1029.6	2				IIIG
			DWIN				1057.5		1				IIIB
			DWIN				1126.4		1				IIIB
			DWIN				1154.5	1154.5	1				IIIG
			DWIN				1206.0	1207.9	2				IIIGG
			DWIN				1246.3	1248.8	2				IIIGG
	1300	2330	HARV										
			DWIN				1322.2		1				IIIB
			DWIN				1337.4	1337.6	1				IIIG
	0457	1640	WEIS				1344.6	1344.7	1				IIIB
			WEIS				1347.9	1348.0	1				IIIB
	0459	1807	DURN	1731.7	1732.0	2	1731.7	1732.0	2				IIIG
	2143	2400	MANI										
	2031	2400	CULG				2254.5	2255					IIIG,W
			CULG				2256.5						IIIB,W
			CULG				2328						IIIB,W
23	0000	1006	MANI										
	0000	0730	CULG	0149	0150								IIIG,W
			CULG	0153.5	0155								IIIG,W
	0458	0946	DURN										
	0727	1745	WEIS										
	0954	2330	SGMR										
	1240	1810	DURN										
	1300	2330	HARV										

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

APRIL 1977

APR 1977	TIMES OF OBSERVATION START UT	TIMES OF OBSERVATION END UT	STATION	EVENTS DECIMETRIC BAND START UT	DECIMETRIC BAND END UT	DECIMETRIC BAND INT	METRIC BAND START UT	METRIC BAND END UT	METRIC BAND INT	DEKAMETRIC BAND START UT	DEKAMETRIC BAND END UT	DEKAMETRIC BAND INT	SPECTRAL TYPE
23	2142	2400	MANI										
	2140	2400	CULG				2156.5		1				IIIB
24	0000	0730	CULG										
	0000	1006	MANI										
	0454	1411	WEIS										
	0457	1812	DURN										
	0952	2331	SGMR										
	1300	2245	HARV										
	1516	1746	WEIS										
	2140	2400	MANI										
	2030	2400	CULG				2257	2259					IIIG,W
			CULG				2326						IIIB,W,U
25	0000	1006	MANI										
	0000	0730	CULG				0111						IIIB,W
	0455	1814	DURN										
	0552	1749	WEIS				0738.5	0739.0	1				IIIG
	0951	2332	SGMR										
	1300	2340	HARV										
	2030	2303	CULG										
	2140	2400	MANI										
	2340	2400	CULG										
26	0000	1006	MANI										
	0000	0543	CULG				0212						IIIB,W
			CULG				0312						IIIB,W
			CULG				0424.5	0425					IIIG,W
	0454	1816	DURN										
	0626	0730	CULG				0647						IIIB,W
	0551	0906	WEIS				0820.6	0821.0	1				IIIB
	0940	1750	WEIS										
	0949	2333	SGMR										
	1300	2245	HARV				2007	2008	1	2007	2008	1	IIIG
	2140	2400	MANI										
27	0000	0414	MANI										
	0000	0730	CULG				0357						IIIB,W
			CULG				0527.5	0529	2				IIIG,V,U
			CULG				0533	0535.5	1				IIIG,V,U
	0625	1006	MANI										
	0948	2335	SGMR										
	1300	2245	HARV										
	0453	1500	DURN	1317.3	1317.4	2	1317.3	1317.4	2				III,G
	0713	1447	WEIS				1317.5	1318.1	2				IIIB
	1503	1750	WEIS										
	2030	2400	CULG										
	2139	2400	MANI										
28	0000	0350	MANI										
	0000	0730	CULG				0024.5						IIIB,W
	0444	1750	WEIS										
	0451	1819	DURN										
	0552	1006	MANI										
	0946	2336	SGMR										
	1300	2245	HARV										
	2139	2400	MANI										
	2030	2400	CULG				2214	2215					IIIG,W
			CULG				2219	2220.5	1				IIIG,V
			CULG				2225	2226	1				IIIG
			CULG				2229	2231					IIIG,W
			CULG				2234.5	2236					IIIG,W
			CULG				2347	2347.5	1				IIIG
29	0000	0130	MANI										
	0000	0712	CULG				0124.5	0125					IIIG,W
	0303	1006	MANI										
			CULG				0410.5						IIIB,W
	0450	1820	DURN										
	0945	2337	SGMR										

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

APRIL 1977

APR 1977	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
29	0446	1753	WEIS				1200.1	1200.2	1				IIIB
	1300	2245	HARV										
			WEIS				1640.8	1640.9	2				IIIG
	2030	2400	CULG				2056	2057.5	1				IIIG
			CULG				2118		1				IIIB
	2139	2340	MANI										
			CULG				2146	2147.5	1				IIIG
	2356	2400	MANI										
30	0000	1006	MANI							0046.8	0048.0	2	III
	0000	0730	CULG	0047	0047.5	1	0046.5	0048	2				IIIG,V,U
			CULG				0101	0102	2				IIIG,U
			CULG				0347.5	0348					IIIG,W
	0448	1821	DURN										
			CULG				0540						IIIB,W
	0944	2338	SGMR										
	1247	2245	HARV										
	0444	1534	WEIS				1326.2	1327.4	1				IIIG
			WEIS				1332.9	1332.2	1				IIIB
	1545	1755	WEIS										
	2030	2400	CULG				2030	2400					IS,W
	2138	2400	MANI										

The symbols used in connection with the spectral type in describing the important bursts are as follows:

B = Single burst
G = Small group (< 10) of bursts
GG = Large group (> 10) of bursts
C = Underlying continuum (particularly with type I)
S = Storm in the sense of intermittent but apparently connected activity
N = Intermittent activity in this period
U = U-shaped burst of Type III
RS = Reverse slope burst
DP = Drifting pairs
DC = Drifting Chains
H = Herringbone
W = Weak
P = Pulsations
CONT = Continuum
UNCLF = Unclassified activity

SELECTED SOLAR EVENTS

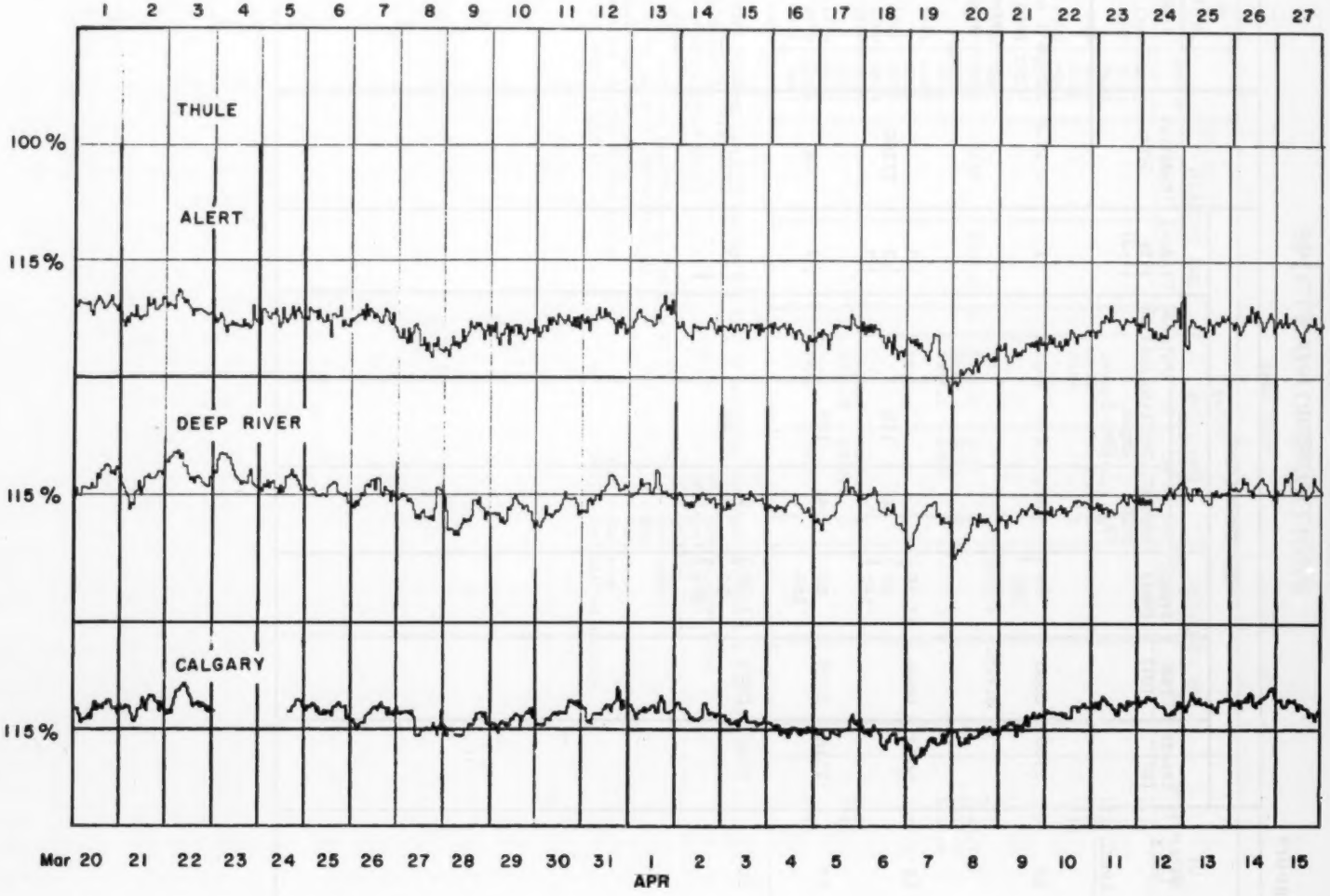
APRIL 1977

Culgoora

UT Date 197.7 APRIL	HELIOGRAPH EVENT							Spectral Type	REMARKS
	Start (UT)	End (UT)	Freq. (MHz)	Positions		Polarization	Intensity (1-3)		
				Central Dist. ($R_\odot$)	Position Angle (Deg.)				
15	2300	0500	80 160	.8	100	r	1	IS,W	Type I and minor III activity persisted from this region until 17th
16	0003	0006	43.25 80 160	.4	140	-	3 2 2	IIIGG	
17	2316	2335	80 160	.4	145	-	2	II	
30	0046	0048	43.25 80 160	.9 .8 .8	85	-	3	IIIG,V,U	

COSMIC RAY INDICES
(Neutron Monitors)

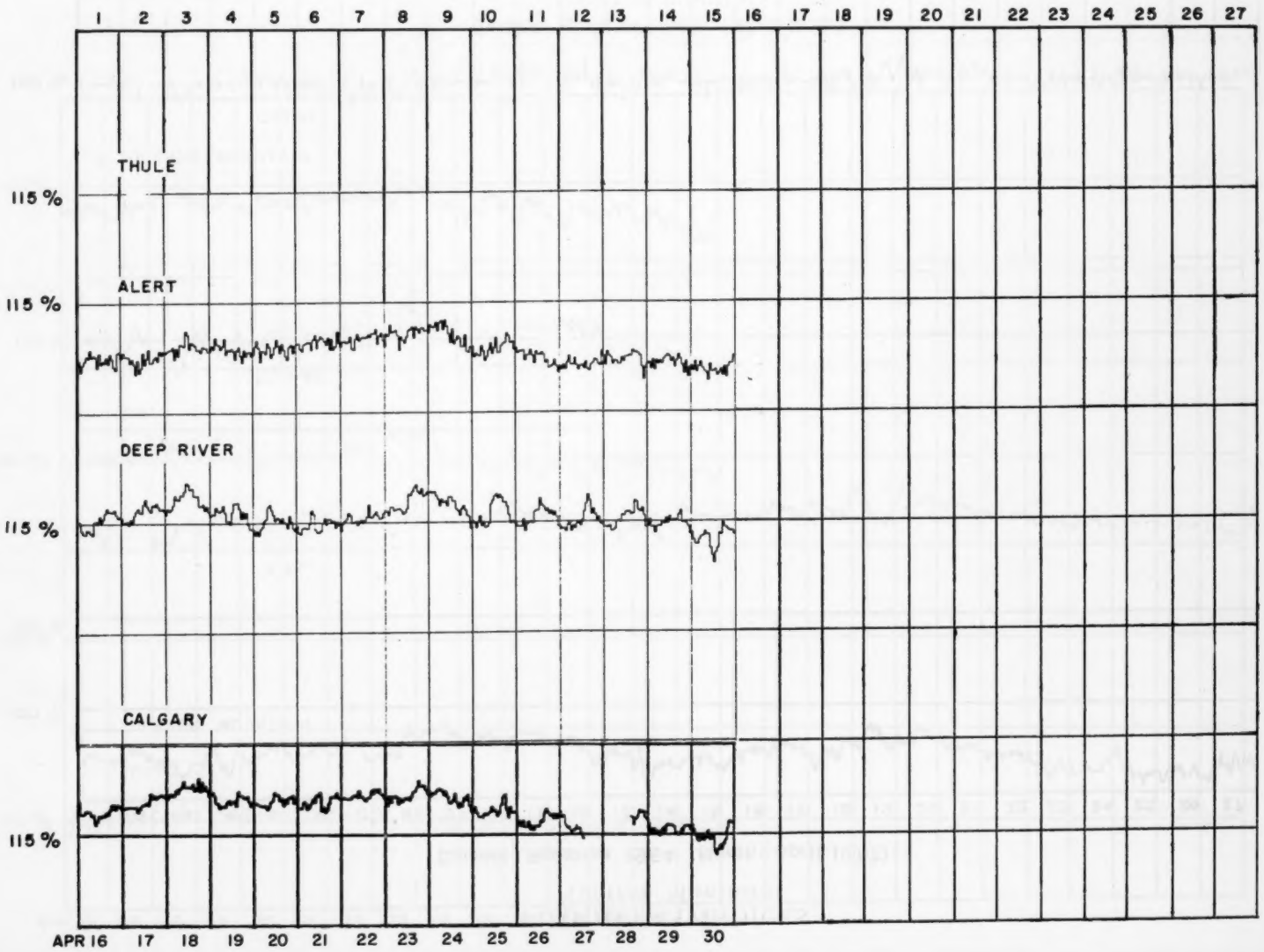
Bartels Rotation 1964 (March - April 1977)



COSMIC RAY INDICES

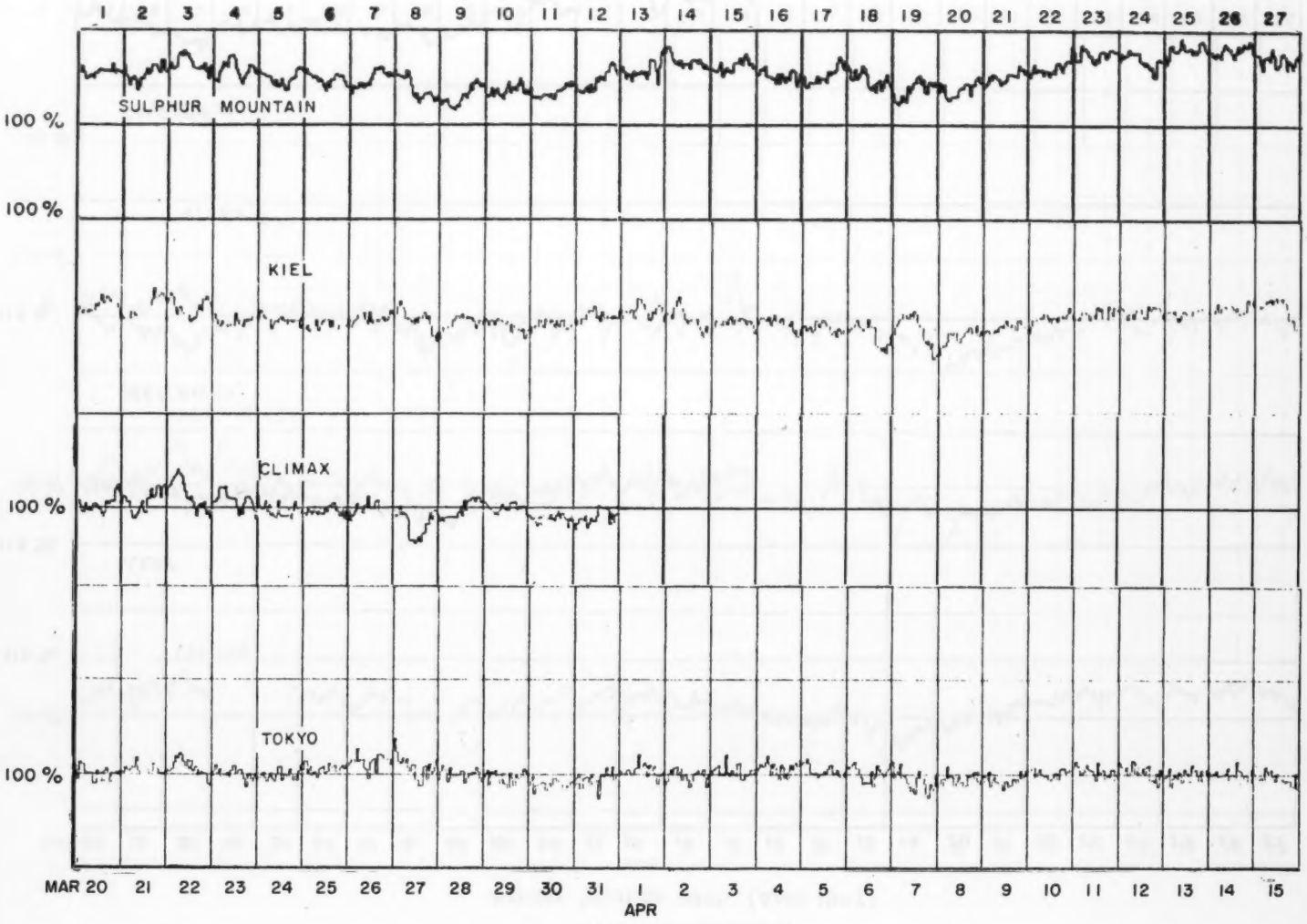
COSMIC RAY INDICES
(Neutron Monitors)

Bartels Rotation 1965 (April 1977)

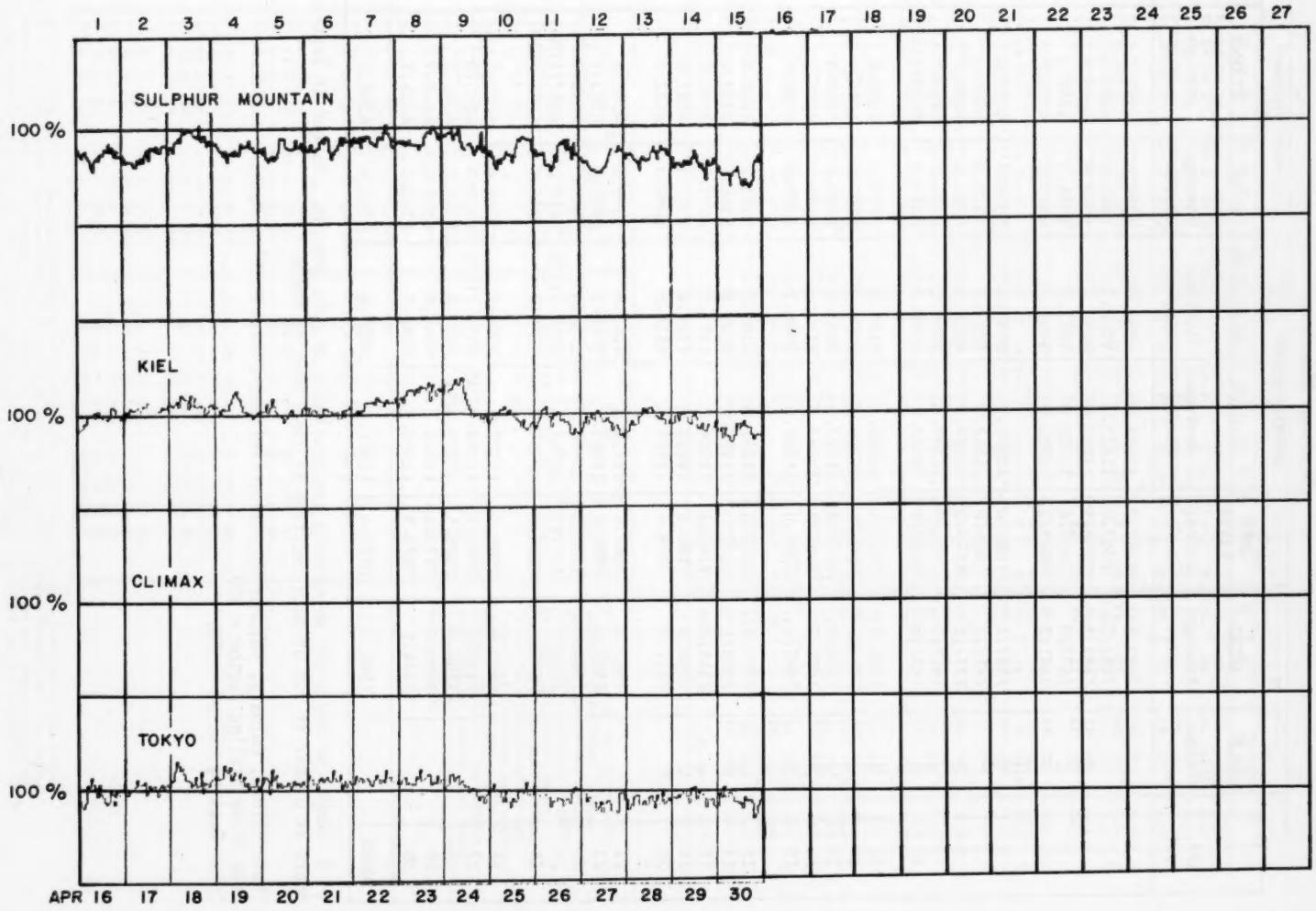


COSMIC RAY INDICES
(Neutron Monitors)

Bartels Rotation 1964 (March-April 1977)



COSMIC RAY INDICES
(Neutron Monitors)
Bartels Rotation 1965 (April 1977)



COSMIC RAY INDICES

(Neutron Monitors)

APRIL 1977

APR. 1977	THULE Average cts/hr	ALERT Average cts/hr	DEEP RIVER Average cts/hr	CALGARY Average cts/hr	SULPHUR MT Average cts/hr	KIEL Average cts/hr	CLIMAX Average cts/hr	TOKYO Average cts/hr
1	Data not available at time of publication	7522.6	7087.7	11834.9	9038.0	6390.7	4277.7	3672.2
2		7486.5	7060.0	11813.3	9080.5	6362.5	4284.3	3662.8
3		7487.5	7058.5	11765.0	9057.7	6348.8	4265.4	3670.2
4		7475.0	7042.6	11707.0	9012.2	6346.3	4249.2	3677.7
5		7481.5	7045.2	11702.0	9014.4	6329.5	4225.9	3672.8
6		7457.1	7040.8	11671.7	8995.2	6309.2	4218.2	3668.3
7		7418.8	7005.0	11612.3	8947.8	6325.0	4209.1	3652.3
8		7377.5	6976.0	11677.9	8951.5	6301.1	4200.5	3655.6
9		7429.2	7022.0	11749.8	9009.0	6331.1	4228.9	3653.7
10		7457.5	7040.9	11822.9	9051.3	6365.0	4258.6(36)	3668.1
11		7504.5	7047.4	11859.3	9115.0	6379.4	4276.2	3671.4
12		7493.5	7065.5	11860.7	9090.0	6387.1	4270.0	3671.3
13		7498.0	7077.8	11872.1	9141.0	6382.9	4280.9	3663.8
14		7507.7	7095.0	11897.5	9137.5	6398.0	4286.1	3665.6
15		7495.6	7091.6	11849.6	9094.1	6399.0	4288.5	3658.2
16		7507.8	7082.8	11857.2	9105.2	6361.9	4260.6	3662.5
17		7509.1	7107.3	11920.9	9102.8	6388.8	4303.4	3675.4
18		7544.2	7140.7	12006.3	9181.0	6407.9	4316.0	3694.4
19		7536.5	7100.8	11932.1	9129.6	6395.2	4327.0	3693.9
20		7537.3	7078.4	11927.8	9126.9	6380.3	4312.3	3685.6
21		7557.3	7069.4	11920.3	9143.0	6379.0	4303.6	3690.5
22		7569.0	7086.9	11963.8	9169.1	6401.5	4305.2	3691.5
23		7584.6	7133.5	11968.1	9169.4	6444.0	4302.4	3691.7
24		7582.2	7127.3	11949.4	9159.5(23)	6418.0	4287.1(36)	3676.5
25		7540.1	7101.2	11863.2	9109.2	6356.6	4285.6(18)	3664.2
26		7510.8	7089.7	11797.2	9098.2	6344.4	4250.7	3657.8
27		7490.2	7081.1	11760.3(14)	9057.7(22)	6337.0	4233.6	3648.1
28		7504.5	7085.5	11825.3(9)	9085.9	6351.0	4245.2	3649.6
29		7493.6	7071.4	11743.2	9049.8	6338.0	4243.7	3657.5
30		7474.1	7028.5	11688.8	8996.5	6303.6	4221.7	3650.5
MEAN		7501.1	7071.4	11827.3	9080.6	6365.4	4266.5	3669.1

( ) Number of hours for which data are available if less than 24. Number of Section Hours at Climax if sum of both sections is less than 40 hours.

Thule, Alert, Calgary, Sulphur Mountain, Kiel and Climax Scaling Factors = 100.
Deep River Scaling Factor = 300.
Tokyo Scaling Factor = 128.

GEOMAGNETIC ACTIVITY INDICES

APRIL 1977

Day	Three-Hourly Indices Kp									Three-Hourly Indices Km								Ap	aa *				Cp
		1	2	3	4	5	6	7	8	Sum	1	2	3	4	5	6	7	8		N	S	M		
1	Q3	0+	1+	2+	1-	1-	1	1	0+	8-	1-	1+	3-	1-	1+	1+	1	0+	4	6	11	10	8 CC	0.1
2	Q5	1-	1+	1+	2	0+	1	0+	3-	10-	1+	1	1+	2	1	1	0+	3-	5	12	10	11	12 CK	0.2
3		4	3-	3-	2+	1+	1+	2	3	19+	3+	2	2+	2+	1+	1+	2+	3-	12	23	17	23	18		0.7
4		5+	4+	4+	2+	3+	3-	3+	3+	29	5-	4-	4-	2	3-	2+	3+	3	24	42	32	39	34		1.2
5		4-	2+	3-	2-	2-	2	3	3+	20+	3+	2-	2+	2+	2-	2+	3	3	12	22	19	20	22		0.7
6	Q3	4	4	3	2-	4-	6-	6+	7	35+	4-	3	3	2-	3-	5	5	6-	49	74	49	23	101		1.6
7	Q2	7-	6	5+	4	4+	3-	5+	3-	37	5	5-	5-	4-	4	3-	4	3	48	60	52	65	48		1.6
8	Q4	4+	3+	4+	4-	3+	5-	4-	4+	32-	4+	3	4-	4-	3+	4-	3+	4	27	45	37	38	45		1.2
9		4+	4	4	3	4-	4-	3-	3	28+	4	4-	4-	3-	3+	3	2+	3	22	33	34	38	29		1.1
10		3	4-	3-	1+	2+	4-	3	2	22-	3+	3	2+	1	2+	3	3-	2+	13	25	21	21	26		0.8
11		3+	3+	2	1+	3	2+	3+	4-	22+	3	2+	2	2-	3-	3-	3	3+	14	29	19	18	31		0.8
12		3	1+	0	1+	2	2-	2	4-	15	3-	1+	0	1+	2	2-	2+	4-	8	20	14	12	23		0.5
13	Q7	2+	0+	2-	1	1+	1+	1	2	11	2	1-	2-	1	1+	1-	1	2	5	11	10	9	12	C	0.2
14		3+	1+	4-	2	1-	2-	2+	4-	19-	3	1+	3+	3-	1+	2+	3-	3	12	21	23	24	20		0.7
15		3+	4-	3	2-	2	1	1-	2-	17	3-	3	3	1+	2	1	1-	1+	10	18	15	22	11		0.6
16		1+	3+	2	1+	3+	4	4+	4-	23+	1+	3	2	2-	2+	4-	4+	4-	17	35	27	16	46		0.9
17		3+	3-	2+	2+	1+	1+	2	2	17+	3+	2+	3-	2+	1+	1	2-	2-	9	18	14	20	13		0.5
18	Q0A	2	2-	1-	2+	3-	3	2	2-	16	2	2-	1	3-	2+	2+	2+	1+	8	19	15	14	21		0.4
19	Q1	3+	6-	6+	6-	5	4+	4-	5-	39-	3	5	6-	5	5-	4	3+	4	48	60	64	77	48		1.6
20	Q5	4+	4-	4+	5-	3	5	3+	3	31+	4	3	4	4	3	4+	3	3-	28	45	42	44	43		1.2
21		3+	3	4-	2	1+	2-	3-	2+	20	3-	2+	3+	2+	1	2-	3-	2+	12	22	14	21	16		0.7
22	Q8	2-	2-	3-	1	1-	2-	2-	0+	11+	2-	2-	2+	1+	1-	2	2-	1	6	11	10	11	10	CC	0.3
23	Q6	1-	2	2-	1+	1+	1	2-	2-	11+	1-	2+	2	1+	2-	1+	2-	1+	5	14	12	12	14	CC	0.2
24		2	1+	1+	3-	2+	4	3-	3-	19	2-	1+	2	3-	2+	3+	2+	2+	11	22	21	12	31		0.6
25		e-	5	4-	3	1+	2	1	1+	23	5	4+	3+	3-	1	1+	1	1+	22	29	26	45	11		1.1
26	Q2	1+	1+	1+	1	1-	1+	1-	1-	8+	1	2-	2-	2-	1-	1+	1	1-	4	11	10	11	10	CC	0.1
27	Q1	1+	1+	1-	1+	1	1-	0+	1	6-	1+	1+	1	1+	1	1-	0+	1+	4	9	8	10	7	CC	0.1
28	Q4	1	1	0+	1-	0+	1+	2	2+	9	1-	1-	1-	1-	1-	1+	2-	2	4	13	9	9	13	C	0.2
29		3+	4-	4	3+	4-	2-	3-	4-	26	3	3+	4	3+	3+	2-	3-	3	18	33	34	36	31		1.0
30	Q9A	2	3	1+	2-	2-	2-	2	2+	16-	2-	3-	2-	1+	2	2-	2	2+	8	16	18	15	20		0.4
																		Mean	16	26.7	22.9	24.9			0.71

Day	Three-Hourly Indices Kn								Three-Hourly Indices Ks							
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
1	0+	1+	3-	0+	1+	1+	1	0+	1	2-	3-	1	1+	1	1-	0+
2	1	1-	1+	2-	1-	1+	0	3-	1+	1+	2-	2	1	1	0+	2+
3	3	2-	2+	3-	1+	2-	2+	3-	3+	2+	2+	2+	1+	1	2+	3-
4	3-	4-	4-	2	3	3-	3	3+	5-	3+	4-	2	3-	2+	4-	3
5	3+	2-	2+	2+	2	2	3	3-	3+	2-	2+	2+	2-	3-	3	3
6	3+	3+	3	2-	3-	5	5	6-	4-	3	3+	1+	2+	5	5	5+
7	5+	5-	5	4-	4	3-	5-	2+	5	5-	5-	3+	4	2+	4-	3+
8	4	3-	4-	4-	3	4-	3	3+	5-	3	4-	4-	3+	4-	3+	5-
9	3+	4-	4	3-	3+	3-	2+	3-	4+	4-	3+	2+	3+	3+	2+	3
10	3	3	2+	1+	2+	3	3-	2-	4-	3-	2+	1	2+	3	3-	3-
11	3-	3-	1+	1+	3-	3-	3	3	3	2+	2+	2-	3-	3-	3	4-
12	2+	1	0	1+	2	2	2+	3	3+	1+	0+	1	2	2-	2+	4
13	2	0+	2-	1	1+	1	1+	2	2-	1	2-	1	1	0+	1	2
14	3-	1	3+	3	1	2+	3-	3-	3+	2-	3+	3-	2-	2	3-	4-
15	3-	3	3-	2-	2	1+	0+	1+	3-	3+	3	1+	2-	1	1-	2-
16	1+	3-	2	2	3-	3+	4	3	2-	3+	2	1+	2	4	5-	4
17	3	2+	3-	2+	1+	1	2-	2-	4-	2+	2+	2+	2-	1	1+	2-
18	2	1+	1	3-	3-	3-	2+	1+	2+	2-	1	2+	2+	2-	2	2-
19	3	5	6-	5-	4	4-	3+	4-	3+	5	6-	5	5-	4	4-	4+
20	4-	3	5-	4+	3	4+	3	3	4+	3+	4-	4-	3	4+	3	3-
21	2+	2+	3+	3-	1	2-	3-	2+	3	3-	3+	2	1	1+	3-	2+
22	2-	2-	3-	1+	1-	2	2-	1-	2-	1+	2+	1+	1	2	2-	1
23	1-	2+	2	1+	2-	1+	2-	2-	1-	2+	2	1+	1+	2-	2-	1+
24	2-	1+	2	3-	3-	3+	3-	2+	1+	1+	2	3-	2+	3+	2-	2+
25	5-	4	3+	3-	1	2-	1	2-	5	5-	3+	2+	1	1+	1	1
26	1	2	2	2	1-	2-	1+	1	1	2-	1+	1+	0+	1	1-	0+
27	1	1	1	1+	1	1-	0+	2-	2-	1+	1	1+	1+	0+	0+	1
28	0+	1-	1-	1	1-	2-	2	2+	1	1	0+	0+	1-	1+	1+	2-
29	3	3+	4	3	3	2	3-	3	3	4-	4	4-	4-	1+	3-	3+
30	2-	3	2	2-	2+	2-	2	3-	2	3-	2-	1	2-	2-	2+	2

* Errata: Note that the N and M values of aa published in these tables for January 1974 through January 1977 values were slightly in error. The correct values (resulting in some modifications in the classification of the days C and K) will be given in a supplementary IAGA Bulletin and the Bulletin 32 series. The magnetic tape deposited in World Data Center A for Solar-Terrestrial Physics has been corrected.

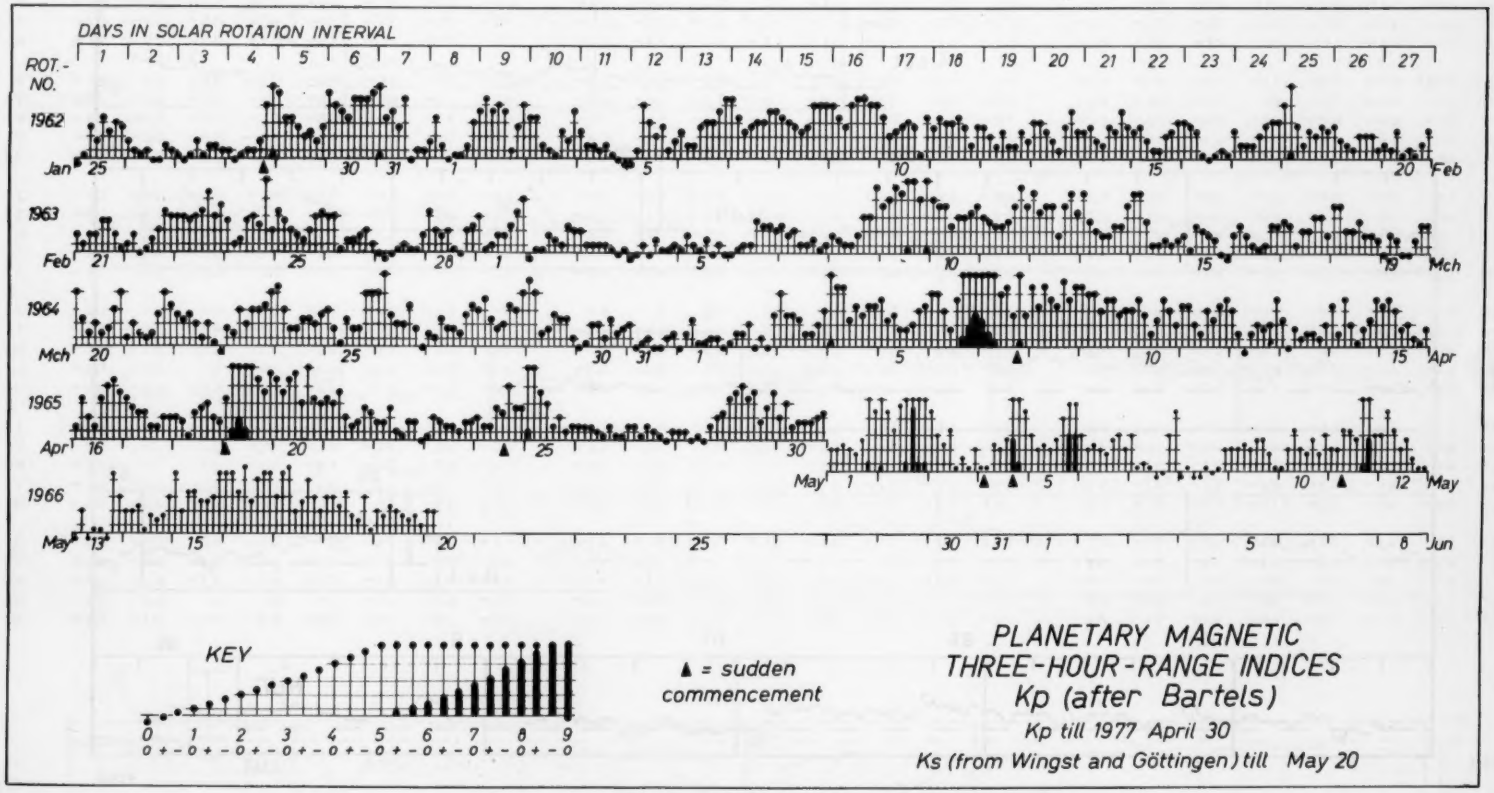
Quiet days (Q) and disturbed days (D), geomagnetic planetary three-hour-range indices (Kp) (integers alone are equivalent to those normally given with a small zero), magnetic character figures (Cp), and average amplitude (Ap) (unit 2γ) prepared by Geophysikalisches Institut at the University of Göttingen, F.R. of Germany for the International Service of Geomagnetic Indices. Ten most quiet days (Q1-Q0[10]) and five most disturbed days (D1-D5) are ordered from most quiet or disturbed, respectively. A or K means "not really quiet" (A = "Ap>6", K = "Ap <6 but one Kp >3o or two Kp values >3-"). An * means "not really disturbed" (Ap<20).

Geomagnetic three-hourly indices (Kn), (Ks) and (Km) as in IAGA-Bulletin No. 32 and indices (aa), "antipodal", as in IAGA-Bulletin No. 33 prepared by P. N. Mayaud of the Institut de Physique du Globe, Paris, France. Really quiet (C) and quiet but slightly disturbed three-hourly intervals (K) are given for 24-hour and 48-hour intervals centered on 12 UT.

DAILY AVERAGE INDICES Ap

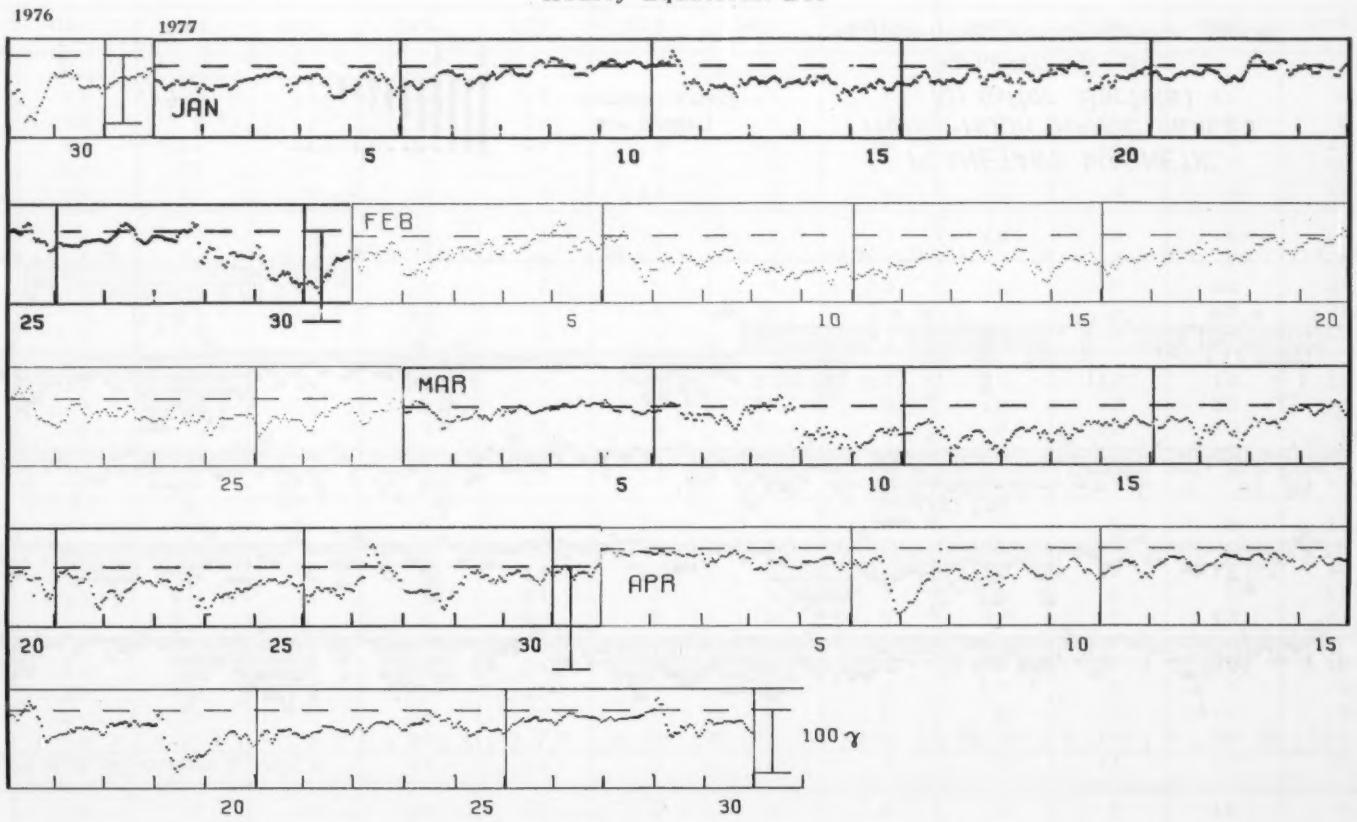
	1976								1977			
DAY	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR
1	10	6	18	8	10	14	10	7	17	7	11	4
2	58	6	9	8	24	21	7	3	5	21	5	5
3	94	12	12	10	10	9	6	4	6	11	4	12
4	20	20	14	5	14	6	4	15	10	4	3	24
5	14	20	6	6	9	13	3	6	15	9	4	12
6	8	7	6	5	7	11	2	3	10	14	6	49
7	10	13	9	5	10	6	3	10	7	18	5	48
8	10	8	13	4	7	6	6	23	6	18	12	27
9	4	4	10	12	6	6	8	16	6	25	38	22
10	6	6	6	9	5	6	18	13	3	12	19	13
11	11	26	4	5	4	8	23	13	14	13	18	14
12	7	7	5	3	8	14	24	15	12	7	22	8
13	6	4	4	3	5	8	31	8	7	12	13	5
14	4	3	6	4	10	7	16	4	18	11	12	12
15	5	4	19	2	10	33	9	2	13	8	5	10
16	5	5	16	6	6	29	5	8	7	6	6	17
17	4	14	5	5	10	30	7	10	6	9	9	9
18	3	21	6	4	33	19	5	28	10	17	11	8
19	12	4	6	6	20	7	9	7	8	6	5	48
20	19	5	4	5	51	7	7	5	12	5	13	28
21	11	3	3	8	24	7	4	4	5	7	10	12
22	11	3	4	5	17	5	5	8	7	8	7	6
23	14	4	5	30	12	6	4	5	6	18	14	5
24	6	16	4	25	7	6	3	6	8	14	12	11
25	9	18	9	24	24	5	11	9	9	11	12	22
26	6	7	4	18	13	4	9	6	4	8	16	4
27	5	6	8	13	12	7	8	6	4	3	8	4
28	14	5	16	10	5	5	2	6	13	7	15	4
29	22	5	18	6	10	3	6	45	15		14	18
30	17	29	19	6	9	16	11	13	30		5	8
31	9		7	5		34		12	19		4	
MEAN	14	10	9	9	13	12	9	10	10	11	11	16

GEOMAGNETIC ACTIVITY INDICES


DAYS IN SOLAR ROTATION INTERVAL
ROT.-NO.
1962
Jan 25 30 31 1 5 10 15 20 Feb
1963
Feb 21 25 28 1 5 10 15 19 Mch
1964
Mch 20 25 30 31 1 5 10 15 Apr
1965
Apr 16 20 25 30
May 1 5 10 12 May
1966
May 13 15 20 25 30 31 1 5 8 Jun
KEY
0 1 2 3 4 5 6 7 8 9
0 + - 0 + - 0 + - 0 + - 0 + - 0 + - 0 + - 0 + - 0
▲ = sudden commencement
PLANETARY MAGNETIC THREE-HOUR-RANGE INDICES
Kp (after Bartels)
Kp till 1977 April 30
Ks (from Wingst and Göttingen) till May 20

GEOMAGNETIC ACTIVITY INDICES

Hourly Equatorial Dst



Note the sensitivity indicator for each month on the last day of the month and also note that the zero reference level is different for each month.

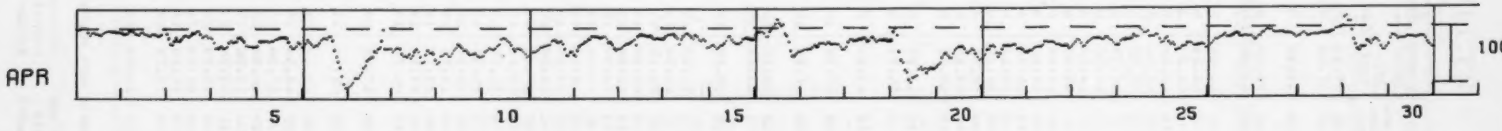
HOURLY EQUATORIAL Dst VALUES (PROVISIONAL)

NASA/GODDARD SPACE FLIGHT CENTER

APRIL 1977

(Time-UT) (Units-Gammas)

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	-2	-2	0	-1	-1	-1	-8	-12	-8	-7	-10	-10	-12	-13	-9	-6	-5	-4	-6	-7	-6	-7	-8	-7
2	-9	-11	-10	-9	-5	-4	-6	-10	-11	-12	-7	-7	-10	-11	-13	-14	-10	-11	-12	-14	-14	-11	-1	-2
3	-10	-18	-28	-29	-22	-17	-22	-23	-19	-14	-12	-14	-15	-12	-9	-8	-5	-5	-11	-10	-13	-12	-10	-16
4	-18	-25	-35	-34	-35	-32	-35	-34	-32	-25	-21	-24	-24	-23	-17	-16	-20	-24	-30	-31	-32	-31	-33	-33
5	-31	-23	-24	-23	-22	-22	-24	-22	-22	-19	-18	-17	-16	-16	-16	-18	-25	-32	-35	-35	-31	-25	-27	-33
6	-32	-26	-20	-25	-28	-32	-30	-30	-25	-20	-17	-17	-19	-14	-15	-22	-39	-50	-59	-69	-84	-98	-104	-11[illegible]
7	-101	-98	-94	-87	-86	-86	-81	-76	-69	-65	-57	-53	-51	-50	-40	-42	-35	-33	-22	-3	-37	-36	-35	-36
8	-41	-37	-34	-35	-36	-45	-48	-48	-50	-45	-52	-47	-41	-37	-41	-50	-60	-58	-46	-39	-43	-42	-45	-56
9	-62	-59	-48	-47	-44	-44	-49	-48	-43	-37	-34	-28	-31	-34	-39	-39	-42	-46	-45	-45	-44	-48	-50	-50
10	-48	-41	-38	-34	-36	-38	-35	-31	-28	-19	-17	-19	-22	-25	-30	-36	-40	-35	-36	-38	-41	-45	-5[illegible]	-48
11	-43	-41	-42	-39	-37	-33	-33	-31	-30	-29	-28	-22	-20	-22	-25	-25	-23	-28	-36	-48	-48	-42	-41	-47
12	-49	-39	-32	-28	-27	-25	-23	-20	-19	-15	-15	-16	-16	-18	-18	-15	-15	-19	-26	-26	-29	-36	-39	-36
13	-36	-34	-31	-29	-28	-27	-25	-22	-20	-30	-15	-12	-13	-13	-14	-15	-15	-15	-18	-23	-18	-19	-20	-19
14	-19	-15	-12	-11	-12	-11	-15	-19	-29	-20	-15	-10	-10	-13	-16	-19	-13	-16	-21	-23	-20	-23	-35	-33
15	-31	-29	-32	-36	-34	-30	-30	-27	-22	-15	-15	-21	-25	-28	-28	-28	-25	-20	-18	-18	-20	-21	-22	-20
16	-13	-8	-7	-7	-10	-16	-15	-7	-3	2	7	14	7	3	5	-11	-14	-25	-41	-50	-50	-45	-42	-42
17	-40	-38	-37	-38	-37	-38	-35	-30	-34	-33	-28	-27	-27	-30	-27	-27	-30	-29	-28	-30	-30	-34	-39	-38
18	-34	-26	-21	-21	-24	-23	-22	-20	-21	-18	-20	-25	-23	-17	-18	-22	-25	-22	-22	-23	-22	-23	-25	-24
19	-23	-8	-2	-15	-44	-59	-62	-76	-79	-93	-97	-88	-86	-84	-73	-69	-75	-72	-80	-74	-70	-73	-72	-69
20	-65	-62	-53	-47	-45	-49	-53	-54	-45	-39	-36	-34	-34	-35	-38	-45	-46	-42	-38	-41	-48	-53	-58	-55
21	-54	-48	-40	-39	-34	-32	-35	-46	-53	-47	-39	-33	-33	-33	-33	-32	-30	-32	-38	-37	-38	-40	-43	-44
22	-44	-41	-41	-37	-35	-34	-34	-35	-32	-26	-25	-27	-27	-26	-28	-31	-31	-32	-34	-34	-33	-34	-38	-35
23	-31	-27	-22	-24	-29	-35	-33	-28	-25	-22	-20	-19	-19	-20	-20	-22	-21	-18	-19	-22	-24	-28	-32	-32
24	-32	-25	-22	-24	-22	-22	-22	-20	-15	-18	-17	-3	-6	-10	-11	-8	-17	-16	-17	-13	-14	-22	-28	-26
25	-21	-18	-27	-31	-28	-32	-41	-39	-38	-34	-34	-33	-29	-27	-29	-32	-33	-33	-33	-31	-30	-32	-37	-36
26	-33	-30	-26	-22	-23	-20	-18	-16	-13	-18	-18	-18	-16	-13	-12	-13	-17	-17	-16	-15	-17	-16	-17	-20
27	-23	-20	-16	-16	-12	-10	-6	-4	-6	-5	-9	-11	-10	-10	-10	-10	-12	-13	-12	-13	-14	-16	-19	-17
28	-16	-13	-11	-14	-17	-16	-14	-14	-14	-14	-14	-12	-12	-12	-13	-13	-11	-9	-8	-4	-3	-2	-2	1
29	15	18	8	8	-8	-25	-33	-41	-43	-37	-38	-36	-27	-29	-32	-26	-23	-25	-28	-30	-42	-42	-37	-32
30	-22	-16	-17	-19	-23	-21	-22	-22	-21	-18	-19	-18	-19	-20	-21	-19	-18	-18	-19	-23	-29	-33	-36	-38



PRINCIPAL MAGNETIC STORMS

APRIL 1977

OBS. 2 letter IAGA code	GEOMAG-NETIC LATI-TUDE	COMMENCEMENT DAY	hr min (UT)	TYPE	SC - AMPLITUDES D(')	H(γ)	Z(γ)	MAXIMUM 3 HOUR - INDEX K DAY(3 HOUR PERIOD)	K	RANGES D(')	H(γ)	Z(γ)	UT END DAY	HOUR
NE	55.1N	2	2156	SC*	2	18	..	04(1)	6	34	107	148	05	04
HD	07.6N	2	2157	SC	- 0.2	+14	- 1	04(1)	4	4	76	27	04	22
BD	48.9N	3	18--	..	..	..	..	04(1)	5	27	97	50	04	12
NE	55.1N	5	19--	..	..	..	..	07(1,3)	7	61	218	264	11	07
BD	48.9N	5	20--	..	..	..	..	07(1)	6	40	157	93	10	12
CO	64.6N	6	14--	..	..	..	..	07(5) 08(6)	7	185	1600	830	09	21
SI	60.0N	6	05--	..	..	..	..	07(1)	7	77	820	510	07	21
WI	54.2N	6	14--	..	..	..	..	06(6,7,8) 07(1,7)	6	35	255	120	08	01
FR	49.6N	6	15--	..	..	..	..	06(8) 07(1)	6	32	125	115	07	15
IR	41.0N	6	1200	..	..	..	..	06(7,8) 07(7)	6	28	160	62	09	22
SJ	29.9N	6	1408	..	..	..	..	06(6)	5	12	133	41	08	12
JP	17.3N	6	12--	..	..	..	..	--	-	7	83	38	09	22
SH	14.6N	6	12--	..	..	..	..	--	-	5	97	31	09	22
UJ	13.5N	6	12--	..	..	..	..	--	-	5	93	33	09	22
AL	09.5N	6	12--	..	..	..	..	06(6,7) 07(7) 08(6)	5	5	78	46	09	22
HD	07.6N	6	1130	..	..	..	..	06(6,7) 07(7)	5	4	102	37	09	21
GU	04.0N	6	1406	..	..	..	..	06(6)	5	0	120	40	09	19
AN	01.5N	6	12--	..	..	..	..	--	-	--	132	--	09	22
TV	01.1S	6	12--	..	..	..	..	--	-	3	196	77	09	22
HU	06.1S	6	0111	..	..	..	..	07(7)	6	6	298	42	08	23
PH	18.7S	6	15--	..	..	..	..	06(8) 07(5,7)	5	6	120	70	09	22
HR	33.7S	6	15--	..	..	..	..	06(6,8) 07(7)	5	28	90	101	07	21
GN	43.3S	6	15--	..	..	..	..	06(6,7,8) 07(5,7) 08(6)	5	21	130	140	09	18
TO	46.7S	6	14--	..	..	..	..	06(6,7,8) 07(3,5)	5	30	203	99	07	20
KG	56.5S	6	1626	..	..	..	..	06(7,8)	7	--	--	--	07	18
FR	49.6N	7	19--	..	..	..	..	07(7)	5	18	130	45	10	09
HD	07.6N	14	0530	..	..	..	..	14(3,6,7,8)	3	5	87	29	15	14
HD	07.6N	15	2334	SC	- 0.1	+ 8	0	16(6,7)	4	5	121	27	17	02
HU	06.1S	16	1140	..	..	..	..	16(6)	5	4	206	26	16	24
HR	33.7S	16	18--	..	..	..	..	16(6)	5	18	75	97	17	01
FR	49.6N	18	21--	..	..	..	..	19(3)	6	22	130	90	21	10
CO	64.6N	19	01--	..	..	..	..	19(3) 20(4)	7	288	1410	910	20	18
SI	60.0N	19	03--	..	..	..	..	19(3)	8	140	--	650	20	11
NE	55.1N	19	0107	SC	1	13	..	19(3)	8	86	324	438	21	12
BD	48.9N	19	03--	..	..	..	..	19(3)	6	35	97	109	21	11
IR	41.0N	19	0200	..	..	..	..	19(2,3,4,5) 20(3,4,6)	5	11	116	65	20	21
SJ	29.9N	19	0030	..	..	..	..	19(2)	5	10	72	19	20	04
JP	17.3N	19	01--	..	..	..	..	--	-	6	140	47	20	18
SH	14.6N	19	01--	..	..	..	..	--	-	5	154	34	20	18
UJ	13.5N	19	01--	..	..	..	..	--	-	5	129	43	20	18
AL	09.5N	19	01--	..	..	..	..	19(2,3) 20(6)	5	5	135	37	20	18
HD	07.6N	19	0045	..	..	..	..	19(3,4)	6	5	166	34	20	22
GU	04.0N	19	0106	SC	.0	-15	-06	19(02)	6	0	200	20	20	18
AN	01.5N	19	01--	..	..	..	..	--	-	4	179	92	20	18
TV	01.1S	19	01--	..	..	..	..	--	-	3	197	107	20	18
HU	06.1S	19	0106	SC	1	13	3	19(5,6)	5	7	176	44	19	23
PH	18.7S	19	0106	SC	0	+14	+13	19(2,3,4)	5	6	170	60	20	18
HR	33.7S	19	00--	..	..	..	..	19(2,3,5)	5	25	144	79	20	02
GN	43.3S	19	03--	..	..	..	..	19(3,4) 20(6)	6	22	100	120	20	00
TO	46.7S	19	03--	..	..	..	..	19(3)	6	31	164	68	20	18
HD	07.6N	24	1037	SC	- 0.2	+ 9	- 1	25(1)	4	4	60	27	25	13
BD	48.9N	25	01--	..	..	..	..	25(1)	6	24	86	41	25	14
NE	55.1N	28	19--	..	..	..	..	29(2,3)	5	24	98	97	30	09
BD	48.9N	28	22--	..	..	..	..	29(2)	5	16	77	26	29	16
JP	17.3N	28	18--	..	..	..	..	--	-	7	96	37	29	22
SH	14.6N	28	18--	..	..	..	..	--	-	7	106	36	29	22
UJ	13.5N	28	18--	..	..	..	..	--	-	6	77	31	29	22
AL	09.5N	28	18--	..	..	..	..	29(2)	5	5	91	34	29	22
HD	07.6N	28	1840	..	..	..	..	29(1,2)	4	5	113	20	29	22
AN	01.5N	28	18--	..	..	..	..	--	-	5	135	50	29	22
TV	01.1S	28	18--	..	..	..	..	--	-	4	167	69	29	22
PH	18.7S	28	18..	..	..	..	..	29(1)	5	4	140	40	29	18
CO	64.6N	29	03--	..	..	..	..	29(3)	7	136	1160	590	29	15

Reports were received from the following observatories:

College Witteveen Tucson Jaipur Alibag Annamalaingar Port Moresby Toolangi
Sitka Fredericksburg San Juan Shillong Hyderabad Huancayo Hermanus Port-aux-Francais
Newport Boulder Honolulu Ujjain Guam Trivandrum Gnangara

SUDDEN COMMENCEMENTS AND SOLAR FLARE EFFECTS

APRIL 1977

PRELIMINARY REPORT ON RAPID MAGNETIC VARIATIONS (by Dr. A. Romaňá)
The meaning of the station symbols is given in the IAGA-Bulletin nr. 32.
Times of ssc are mean values.

Sudden commencements followed by a magnetic storm or a period of storminess (ssc)

02 2157 A: LM DU; B: WN FU VI CI AE PM HU GN; C: EB SZ (si: C: TL)

07 1845 A: LM; B: SO WN WI FU? AE SZ DU (si: A: EB SZ HU; B: NI TL)

19 0106 B: WN FU PM HU; C: WI MT KA KY SZ (bs: B: EB)

Solar-flare effects (sfe)
Effects confirmed by solar or ionospheric observations are underlined.

12 0946 - 1017 WN NI EB TL (bs: A: LM)

14 0540 - 0615 KA

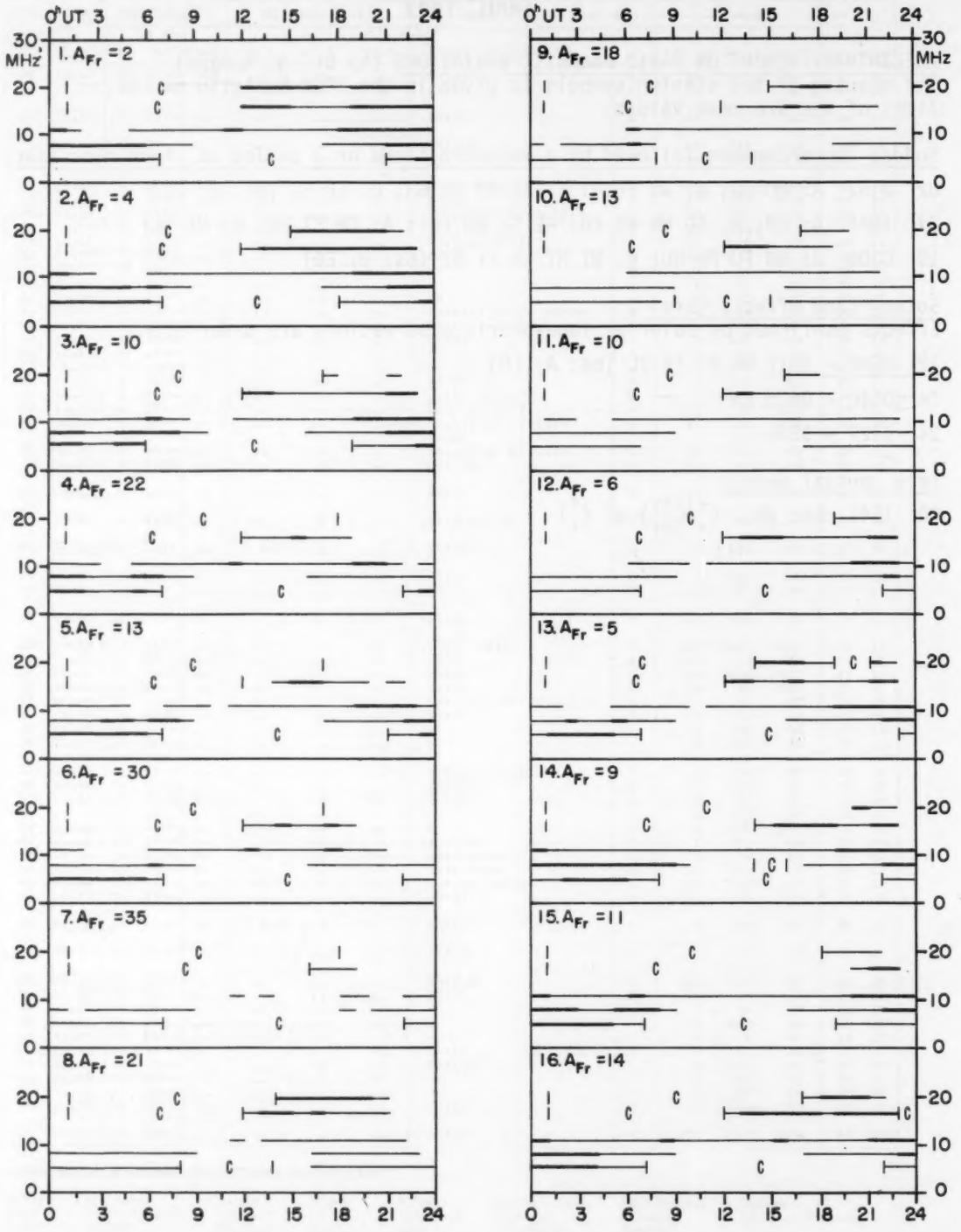
24 1227 - 1249 TL

Very unusual events

20 1641 bp: WN $\binom{+124\gamma}{+\ 83\gamma}$ WI $\binom{+}{+}$

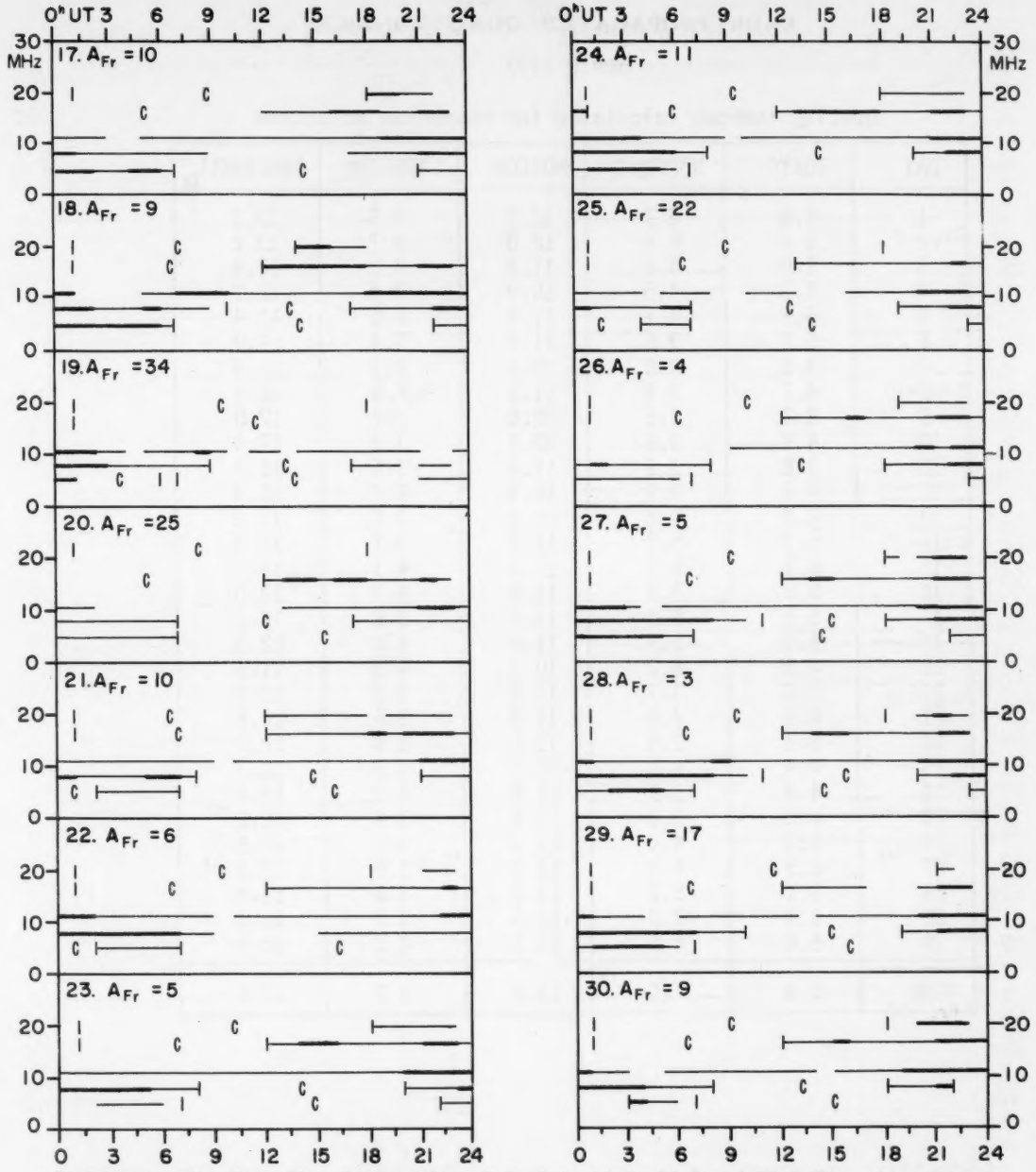
TRANSMISSION FREQUENCY RANGES -- NORTH ATLANTIC PATH

APRIL 1977



TRANSMISSION FREQUENCY RANGES -- NORTH ATLANTIC PATH

APRIL 1977



Field strengths from five frequencies, 5.0, 8.1, 10.9, 16.4 and 20.0 MHz, observed on a Lüchow - Norfolk circuit are represented above. Heavy solid lines represent field strengths ≥-12 dB above 1 μv/m (transmitter power reduced to 1 kW). Observed field strengths between -12 dB above 1 μv/m and -40 dB above 1 μv/m are represented by the fine line.

Adapted from Observations by Deutsche Bundespost

RADIO PROPAGATION QUALITY INDICES

APRIL 1977

Quality indices calculated for reception at Lüchow

DAY	TOKYO	NORFOLK	MOSCOW	CANBERRA	BRACKNELL
1	5.8	6.9	12.2	4.5	13.1
2	5.2	6.8	12.0	4.7	13.2
3	5.0	5.6	11.8	4.3	12.4
4	4.3	4.8	10.9	3.4	12.1
5	5.5	4.7	11.9	4.0	12.4
6	5.2	3.6	11.7	3.4	12.0
7	3.8	3.0	10.1	2.9	11.4
8	4.7	3.4	11.2	4.5	12.3
9	3.2	3.5	10.6	3.2	12.0
10	4.3	3.6	10.8	3.3	12.4
11	3.8	3.5	11.2	3.8	12.2
12	4.6	3.9	10.3	2.7	12.3
13	4.7	4.8	11.8	3.6	12.3
14	5.3	5.2	11.8	3.7	12.4
15	6.4	5.5	11.8	4.1	12.7
16	5.8	5.6	11.6	4.3	13.0
17	5.5	5.2	11.4	3.6	12.3
18	6.0	5.7	11.8	4.0	12.3
19	4.2	4.2	10.1	4.3	11.6
20	3.6	3.7	11.5	3.2	12.8
21	4.6	4.6	11.3	3.6	12.5
22	5.1	2.8	11.2	3.8	12.9
23	4.4	4.5	10.9	4.3	12.7
24	4.4	3.9	11.6	4.0	12.4
25	4.2	3.0	11.6	3.4	12.1
26	6.1	4.5	11.4	3.1	12.5
27	6.5	4.8	11.8	3.0	12.5
28	6.1	5.2	11.2	2.6	12.4
29	5.3	3.6	11.5	3.9	12.3
30	5.6	4.5	11.2	4.3	12.5
MEAN	5.0	4.5	11.3	3.7	12.4

USCOMM-NOAA-ASHEVILLE, NC--7-8-77--950

P-A STACKS

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June 1977 Number 394-Part II

Solar-Geophysical Data comprehensive reports

Data for December 1976–November 1976 & Miscellanea

Explanation of Data Reports Issued as Number 390 (Supplement) February 1977

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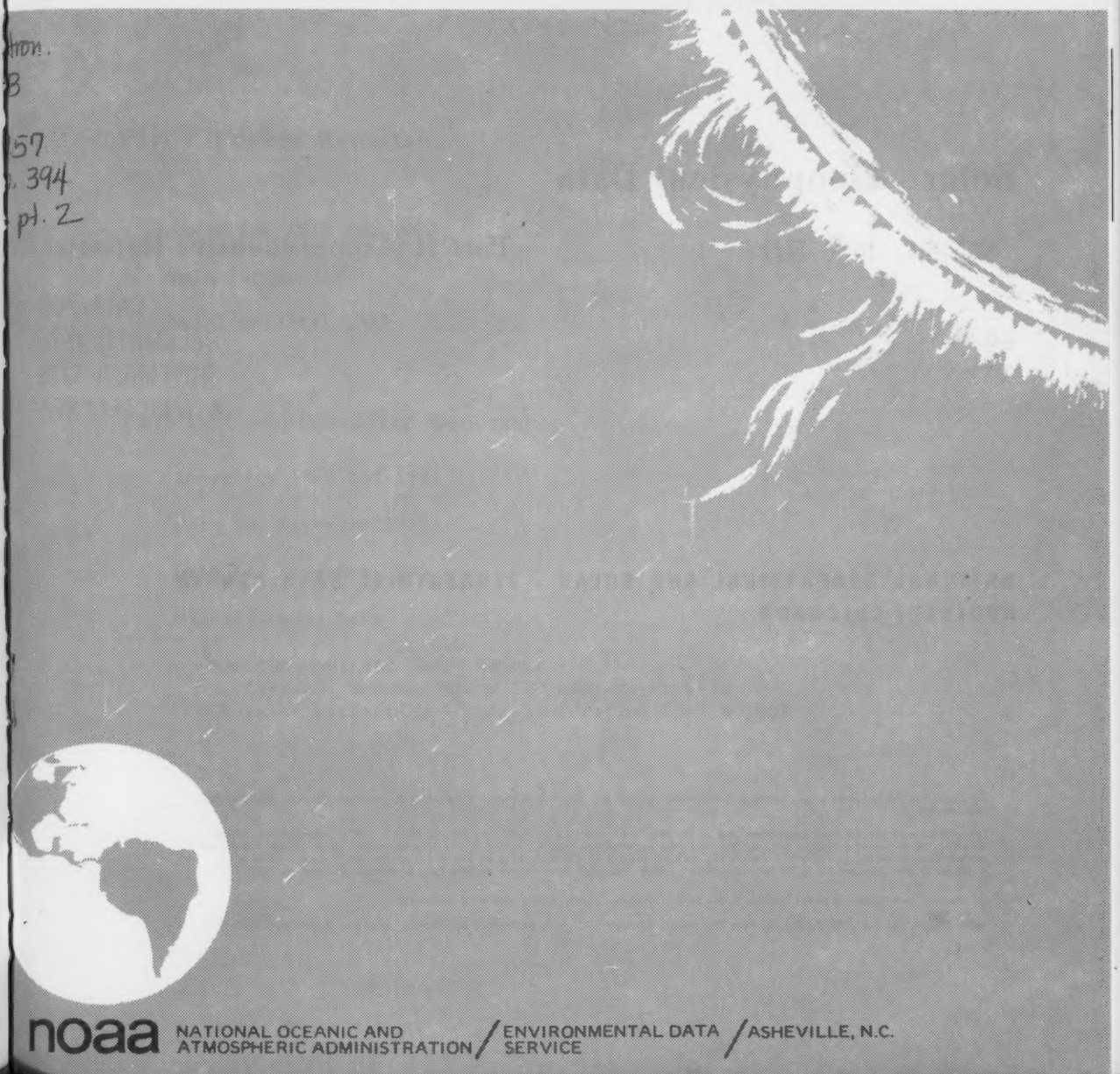

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Solar - Geophysical Data

NO. 394 JUNE 1977

Part II (Comprehensive Reports)

DATA FOR
DECEMBER 1976
NOVEMBER 1976
& MISCELLANEA

NATIONAL GEOPHYSICAL AND SOLAR - TERRESTRIAL DATA CENTER
BOULDER, COLORADO

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To standardize referencing these reports in the open literature, the following format is recommended:

Solar-Geophysical Data, 390 Part I (or Part II), pages, February 1977, U.S. Department of Commerce, (Boulder, Colorado, U.S.A. 80302).

SOLAR - GEOPHYSICAL DATA

No. 394

Issued in two parts

Helen E. Coffey, Editor

J. Virginia Lincoln, Director
Solar - Terrestrial Data Services Division

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Note: A = Part I, B = Part II.

386A 22 listed under 1976 Aug shows that data for August 1976 were contained in *Solar-Geophysical Data* Number 386 - Part I beginning on page 22.

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ACTIVE REGIONS

CARRINGTON ROTATION 1648

(November 7 - December 4, 1976)

Region No.	Coordinates		Age at CMP	IMP.	Spot-less Region	Region No. in Rotation 1647	Activity at West Limb
	Lat.	Long.					
1	22°N	295°	-4	1	x		increasing
2	5 S	240	>6	1	x		dispersed
3	30 N	183	>6	1	x	(6)	dispersed
4	10 N	145	>6	3			decreasing
5	30 N	127	>6	1	x		dispersed

ACTIVE REGIONS

CARRINGTON ROTATION 1649

(December 4 - December 31, 1976)

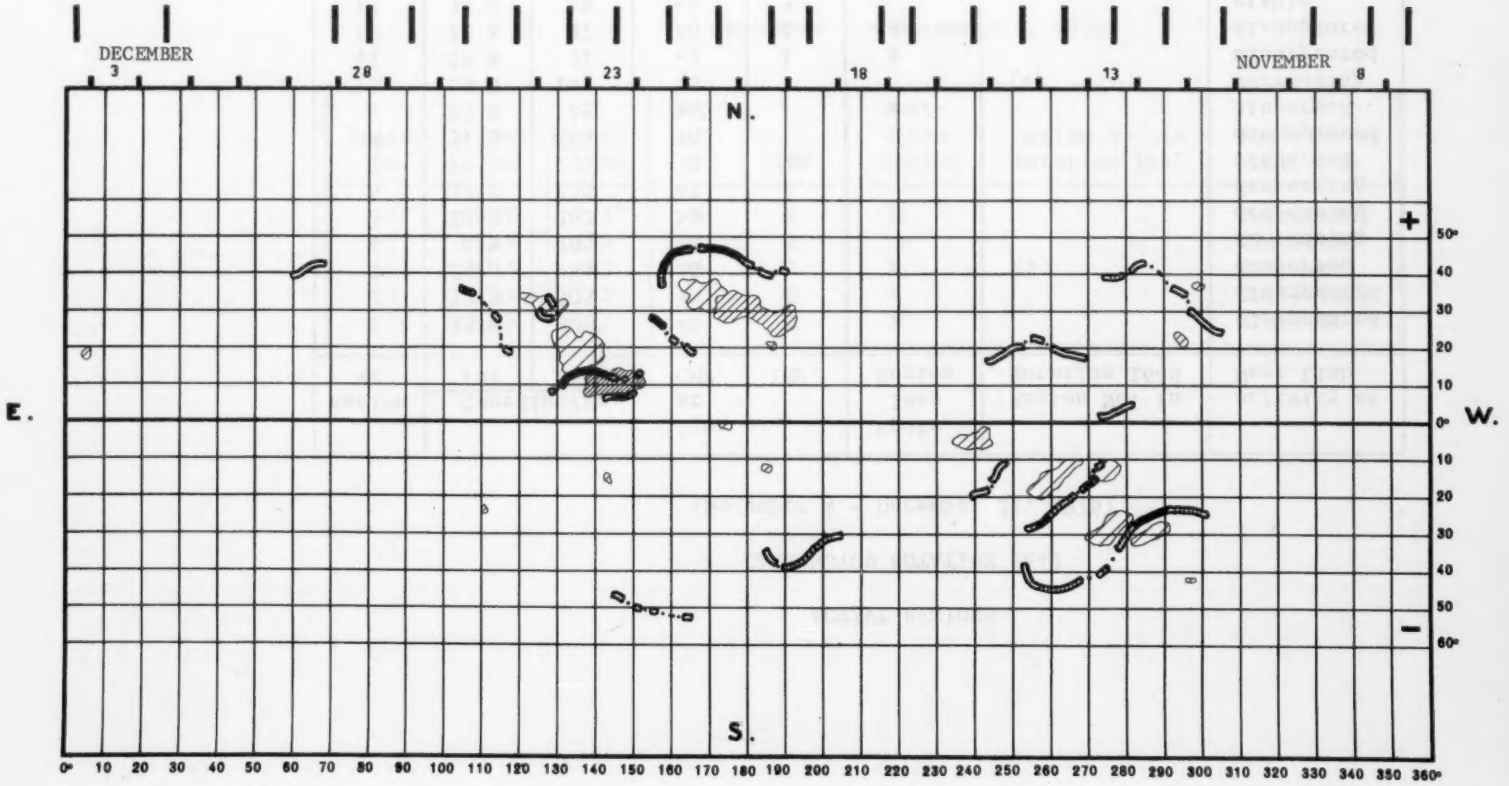
Region No.	Coordinates Lat.	Coordinates Long.	Age at CMP	IMP.	Spot-less Region	Region No. in Rotation 1648	Activity at West Limb
1	35°N	308°	+6	1	x		disappeared
2	32 N	305	>6	1	x		disappeared
3	24 N	294	>6	1	x		dispersed
4	6 N	265	+4	3			decreasing
5	29 N	262	>6	1	x		decreasing
6	27 S	235	+2	2			decreasing
7	26 S	232	0	2			dispersed
8	31 S	194	+6	1	x		disappeared
9	25 S	146	+4	1	x		dispersed
10	13 N	145	>6	2		(4)	decreasing
11	29 N	31	-3	1	x		disappeared
12	22 S	27	>6	1	x		disappeared
13	33 N	19	-2	3			stable
14	20 S	11	>6	4			decreasing

SYNOPTIC SOLAR MAP

CARRINGTON ROTATION 1648

NOVEMBER 7 TO DECEMBER 4, 1976

MEUDON OBSERVATORY

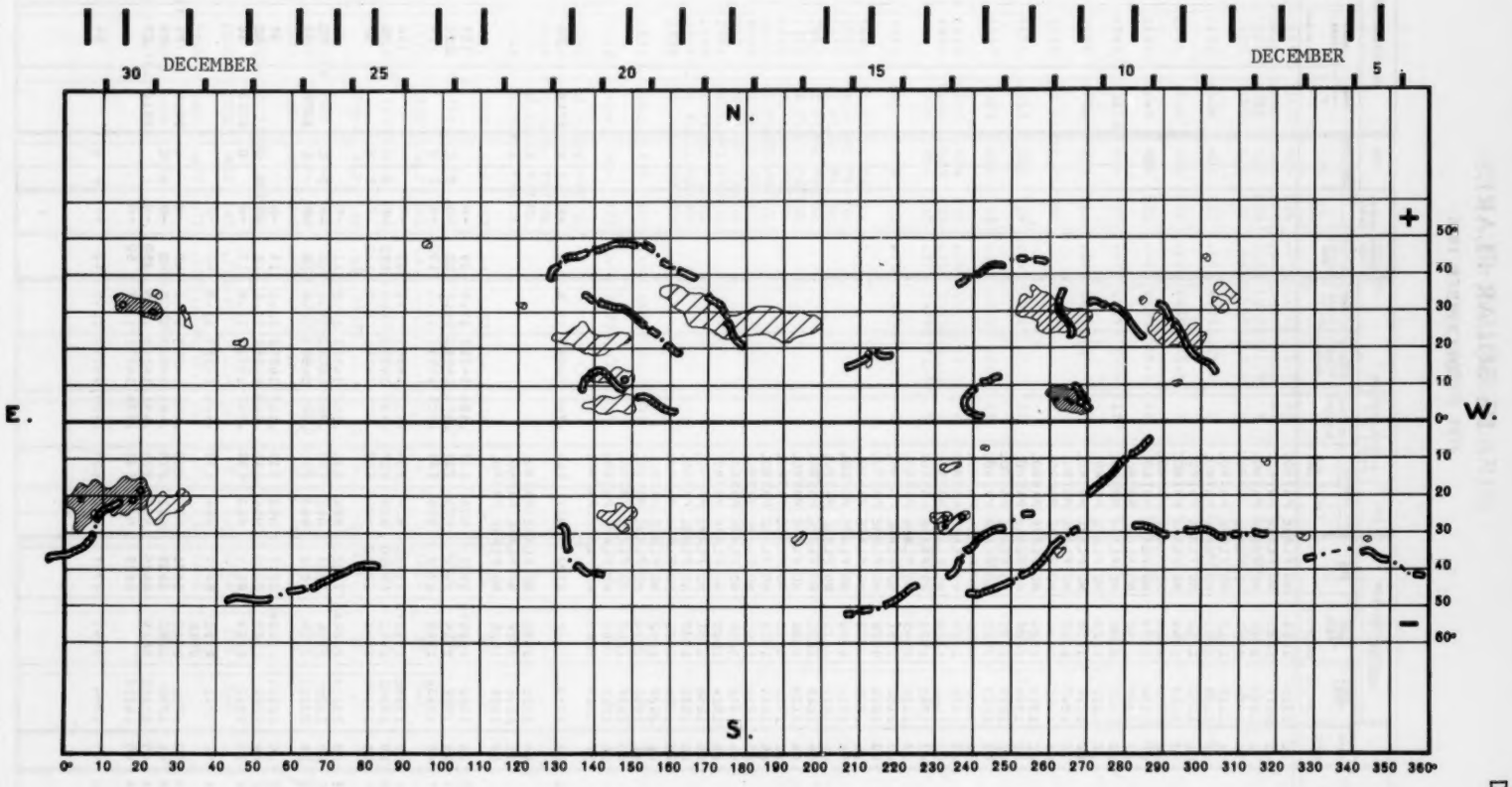


SYNOPTIC SOLAR MAP

CARRINGTON ROTATION 1649

DECEMBER 4 TO DECEMBER 31, 1976

MEUDON OBSERVATORY



Hα SOLAR FLARES

DECEMBER 1976

OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS		MEASUREMENTS			REMARKS
	DATE DEC	START	MAX PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMR DAY	MIN.		CONG	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg.	
	01	0325	0403	NO FLARE PATROL													
	01	0618	0635	NO FLARE PATROL													
	01	0845	0904	NO FLARE PATROL													
	01	0914	0955	NO FLARE PATROL													
	01	1005	1015	NO FLARE PATROL													
	01	1025	1141	NO FLARE PATROL													
	01	1152	1216	NO FLARE PATROL													
	01	1551	1744	NO FLARE PATROL													
	02	0326	0329	NO FLARE PATROL													
	02	0334	0339	NO FLARE PATROL													
	02	0347	0357	NO FLARE PATROL													
	02	0823	0836	NO FLARE PATROL													
	02	1222	1223	NO FLARE PATROL													
	02	1227	1238	NO FLARE PATROL													
	02	1247	1345	NO FLARE PATROL													
	02	1442	1444	NO FLARE PATROL													
	02	1918	1924	NO FLARE PATROL													
	02	1944	2007	NO FLARE PATROL													
	02	2025	2031	NO FLARE PATROL													
	03	0503	0505	NO FLARE PATROL													
	03	0530	0550	NO FLARE PATROL													
	03	0552	0558	NO FLARE PATROL													
	03	1642	1728	NO FLARE PATROL													
	03	1743	1823	NO FLARE PATROL													
	03	2138	2145	NO FLARE PATROL													
	03	2150	2151	NO FLARE PATROL													
	03	2201	0020	NO FLARE PATROL													
	04	0258	0329	NO FLARE PATROL													
	04	0332	0340	NO FLARE PATROL													
	04	1617	2011	NO FLARE PATROL													
	04	2128	2135	NO FLARE PATROL													
	04	2139	2330	NO FLARE PATROL													
	05	1456	1500	NO FLARE PATROL													
	05	1504	1512	NO FLARE PATROL													
	05	1728	1741	NO FLARE PATROL													
	05	1858	2215	NO FLARE PATROL													
	06	1514	1520	NO FLARE PATROL													
	06	1656	1751	NO FLARE PATROL													
	06	1801	1837	NO FLARE PATROL													
	06	1906	2020	NO FLARE PATROL													
	06	2027	2042	NO FLARE PATROL													
	06	2055	2108	NO FLARE PATROL													
	06	2137	2147	NO FLARE PATROL													
	06	2202	2209	NO FLARE PATROL													
	07	2204	2209	NO FLARE PATROL													
639 CULG	08	0713	0717	0722	N07	E44	.700	14553	11.6	9	-F		C	0718	20	.3	Y5
	08	0821	0830	NO FLARE PATROL													
	08	0856	0927	NO FLARE PATROL													
	08	1005	1026	NO FLARE PATROL													
GRP63640	08	1902	1909+0	1922	N06	E37	.608	14553	11.6	20	-N				110	1.4	H
RAMY	08	1902	1909	1922	N06	E37	.608	14553	11.6	20	-N	3	C		114		DE H
RAMY	08	1903E	1909	1922	N06	E38	.621	14553	11.6	19D	-N	3	V		114		DE H
GRP63641	08	1939E	1941+0	1950D	N24	E04	.412	14550	9.1	11	-F				100	1.1	
RAMY	08	1939E	1941	1950D	N25	E07	.437	14550	9.3	11D	-F	3	C		96		
RAMY	08	1939E	1941	1950D	N24	E02	.408	14550	9.0	11D	-F	3	V		96		
GRP63642	08	2321+1	2324+0	2332	N04	E34	.562	14553	11.5	11	-F				30	.4	H
PALE	08	2321	2324	2331	N05	E33	.549	14553	11.4	10	-F	3	C		26		DE H
CULG	08	2322	2324	2332	N03	E35	.575	14553	11.6	10	-F		C	2326	30	.4	
GRP63643	09	0201+1	0203+0	0217	N03	E33	.547	14553	11.6	16	-N				90	1.1	DH
PALE	09	0201	0203	0219	N04	E33	.548	14553	11.6	18	-N	3	C		90		DE H
MITK	09	0202	0203	0215	N03	E33	.547	14553	11.6	13	-N		C	0203	90	1.1	DH
GRP63644	09	0751	0752	0831	N04	E30	.504	14553	11.6	40	-B						FH
			0810														
ATHN	09	0751	0819	0831	N02	E29	.486	14553	11.5	40	-N		1	0819	82	169.0	
ATHN	09	0751	0752	0831	N02	E29	.486	14553	11.5	40	-B	4	C		95		F H
CATA	09	0800E	0810	0835	N05	E29	.491	14553	11.5	35D	-N	2		0810	28	.3	
ISTA	09	0620E		0825	N06	E32	.536	14553	11.7	5D	-N						
645 ATHN	09	0844	0846	0857	N02	E29	.486	14553	11.5	13	-F	4	C		64		F Y5

Note: Although these flare listings give all reported events, not all possible brightenings are reported. Thresholds of reporting vary from observatory to observatory.

Hα SOLAR FLARES

DECEMBER 1976

OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS
	DATE - DEC	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMR DAY	MIN.		CONF.	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg.	
GRP63646	09	1015>9	1021+5	1045	N04	E28	.474	14553	11.5	30	-F						FH
ATHN	09	1015	1021	1045	N03	E29	.487	14553	11.6	30	-F	4	C		32		F H
HTPR	09	1023	1026	1030	N05	E28	.476	14553	11.5	7	-F		C	1026	10	.1	
CATA	09	1025	1025	1045D	N05	E26	.446	14553	11.4	20D	-N	2		1025	56	.6	
647 HTPR	09	1128	1130	1134	N05	E27	.461	14553	11.5	6	-F		C	1130	20	.2	E Y5
648 HTPR	09	1139	1141	1146	N05	E26	.446	14553	11.4	7	-F		C	1141	30	.3	E Y5
649 HTPR	09	1233	1238	1249	N05	E25	.430	14553	11.4	16	-F		C	1238	10	.1	D Y5
650 ATHN	09	1346	1348	1357D	N04	E25	.428	14553	11.4	11D	-N	4	C		32		F H Y5
651 RAMY	09	1651	1656	1706	N05	E22	.384	14553	11.4	15	-F	4	C		27		H Y5
	09	1818	2240	NO FLARE PATROL													
652 MITK	10	0102	0104	0113	N02	E20	.344	14553	11.5	11	-N		C	0104	100	1.1	DH Y5
653 MITK	10	0305	0307	0325	N02	E19	.328	14553	11.6	20	-F		C	0307	50	.5	DH Y5
GRP63654	10	0835+4	0836	0842	N04	E15	.269	14553	11.5	7	-N				40	.4	H
ATHN	10	0835	0836	0840	N03	E15	.265	14553	11.5	5	-N	3	C		32		F H
BUCA	10	0839		0844	N05	E15	.273	14553	11.5	5	-N		C	0840	53	.6	D
655 ATHN	10	0954	0955	0957	N03	E13	.232	14553	11.4	3	-N		V	0955	33	66.0	Y5
	10	1425	1431	NO FLARE PATROL													
	10	1456	1504	NO FLARE PATROL													
	10	1520	1722	NO FLARE PATROL													
	10	2034	2042	NO FLARE PATROL													
	10	2204	2308	NO FLARE PATROL													
	10	2322	2328	NO FLARE PATROL													
	11	0600	0607	NO FLARE PATROL													
	11	0623	0638	NO FLARE PATROL													
	11	0651	0657	NO FLARE PATROL													
	11	2258	2301	NO FLARE PATROL													
	12	1548	1549	NO FLARE PATROL													
	12	2200	2211	NO FLARE PATROL													
	12	2215	2330	NO FLARE PATROL													
656 HTPR	13	1328	1331	1342	N05	W27	.463	14553	11.5	14	-F		C	1331	20	.2	E Y5
657 HTPR	13	1356	1403	1414	N04	W29	.490	14553	11.4	18	-F		C	1403	20	.2	D Y5
	13	1924	1931	NO FLARE PATROL													
	13	1953	1958	NO FLARE PATROL													
	13	2028	2038	NO FLARE PATROL													
	13	2108	2115	NO FLARE PATROL													
	13	2156	2208	NO FLARE PATROL													
658 CULG	13	2317	2320	2335	S28	E03	.462	14558	14.2	18	-F		C	2325	20	.3	Y5
659 CATA	14	0710E	0715	0755D	S29	W02	.474	14558	14.1	45D	-N	2		0715	56	.6	Y5
660 ZURI	14	1023	1023	1033	N03	W40	.645	14553	11.4	10	-B		C	1023	80	1.1	Y5
661 MCMA	14	1507	1512	1514D	N02	W43	.683	14553	11.4	7D	-N		C	1512	50	.7	DH Y5
662 MCMA	14	1734E		1738D	N02	W44	.696	14553	11.4	4D	-N		C	1734	50	.7	D Y5
GRP63663	14	1917E	1922+8	1938	N04	W46	.722	14553	11.4	21	-N				120	1.7	FH
RAMY	14	1917E	1922	1938	N04	W46	.722	14553	11.4	21D	-N	3	C		121		F H
RAMY	14	1917E	1922	1938	N04	W46	.722	14553	11.4	21D	-N	3	V		121		F H
	14	2126	2222	NO FLARE PATROL													
664 CULG	14	2232	2235	2320	N02	W45	.708	14553	11.6	48	-F		C	2238	100	1.4	Y5
665 CULG	14	2243	2244	2300	N15	E77	.977	14564	20.7	17	-F		C	2248	50		Y5
666 VORO	15 IMP.1 NO. MITK1	0146	0147	0156	N06	W47	.736	14553	11.5	10	?N		C	0147	161	2.4	CE Y5

Hα SOLAR FLARES

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OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS		MEASUREMENTS			REMARKS
	DATE - DEC	START	MAX PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	GMR DAY	MIN.		CONF	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg.	
GRP63667	15	0302+1	0303+2	0318	N04	W48	.746	14553	11.5	16	-N						J
HITK	15	0302	0305	0318	N03	W48	.745	14553	11.5	16	-N		C	0305	50	.8	E
VORO	15	0302	0303	0324	N06	W47	.736	14553	11.6	22	1F		C	0312	287	4.3	CJ
KODA	15	0303	0303	0314	N04	W49	.757	14553	11.5	11	-N			0303	1		CD
	15	1158	1225	NO FLARE PATROL													
	15	1230	1328	NO FLARE PATROL													
668 HTPR	15	1315	1319	1330	S26	W17	.500	14558	14.3	15	-F		C	1319	20	.2	U Y5
GRP63669	15	1345	1351	1408	N03	W54	.810	14553	11.5	23	-F						E
HTPR	15	1345	1351	1408	N04	W54	.811	14553	11.5	23	-F		C	1351	20	.3	E
MCMA	15	1347E		1405D	N03	W54	.810	14553	11.5	18D	-N		C	1401	40	.7	E
GRP63670	15	1456+2	1459+3	1520	N03	W55	.820	14553	11.5	24	-B				70	1.2	Z
HTPR	15	1456	1459	1520	N04	W55	.821	14553	11.5	24	-N		C	1459	40	.7	E
MCMA	15	1457	1459	1510D	N03	W54	.810	14553	11.6	13D	-B		C	1459	45	.8	E
RAMY	15	1458E	1502	1515D	N03	W55	.820	14553	11.5	17D	-B	3	V		121		FDE
RAMY	15	1458	1501	1519	N03	W55	.820	14553	11.5	21	-B	3	C		90		Z F
	15	1753	1804	NO FLARE PATROL													
	15	1854	1903	NO FLARE PATROL													
	15	1935	2009	NO FLARE PATROL													
	15	2012	2018	NO FLARE PATROL													
	15	2058	2108	NO FLARE PATROL													
671 RAMY	16	1251	1255	1306D	S26	W36	.678	14558	13.8	15D	-F	4	C		46		FDE Y5
	16	1451	1646	NO FLARE PATROL													
	16	1734	1738	NO FLARE PATROL													
	16	1937	1942	NO FLARE PATROL													
672 CULG	16	2309	2313	2330	S34	E51	.847		20.8	21	-F		C	2315	60	1.0	Y5
	17	1012	1106	NO FLARE PATROL													
	18	0619	0708	NO FLARE PATROL													
	18	0715	0722	NO FLARE PATROL													
	18	1030	1109	NO FLARE PATROL													
	18	1537	1557	NO FLARE PATROL													
	18	1700	1728	NO FLARE PATROL													
	18	2030	2036	NO FLARE PATROL													
	18	2049	2103	NO FLARE PATROL													
	19	0835	0838	NO FLARE PATROL													
	19	1525	1534	NO FLARE PATROL													
	19	2108	2110	NO FLARE PATROL													
	20	0425	0547	NO FLARE PATROL													
	20	0551	0615	NO FLARE PATROL													
	20	0627	0657	NO FLARE PATROL													
	20	0757	0816	NO FLARE PATROL													
	20	2052	2255	NO FLARE PATROL													
	21	0353	0401	NO FLARE PATROL													
	21	0404	0437	NO FLARE PATROL													
	21	0442	0457	NO FLARE PATROL													
	21	0517	0604	NO FLARE PATROL													
	21	0624	0632	NO FLARE PATROL													
	21	0654	0730	NO FLARE PATROL													
	21	0735	0800	NO FLARE PATROL													
	21	2050	2057	NO FLARE PATROL													
	21	2147	2216	NO FLARE PATROL													
	21	2305	2311	NO FLARE PATROL													
	21	2316	2345	NO FLARE PATROL													
	22	0506	0527	NO FLARE PATROL													
	22	0550	0611	NO FLARE PATROL													
	22	0723	0756	NO FLARE PATROL													
	22	2135	2154	NO FLARE PATROL													
	22	2204	2255	NO FLARE PATROL													
	23	0520	0529	NO FLARE PATROL													
	23	0710	0720	NO FLARE PATROL													
	23	0802	0810	NO FLARE PATROL													
	23	0845	0851	NO FLARE PATROL													
	23	2029	2039	NO FLARE PATROL													
	23	2142	2154	NO FLARE PATROL													
	23	2203	2248	NO FLARE PATROL													
673 HTPR	25	1258	1302	1306	S20	E65	.912	14579	30.4	8	-F		C	1302	20	.5	D Y5
	25	1349	1404	NO FLARE PATROL													

Hα SOLAR FLARES

DECEMBER 1976

OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IMPOR-TANCE	OBS		MEASUREMENTS			REMARKS	
	DATE DEC	START	MAX. PHASE	END	APPROX. LAT.	APPROX. MER DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMR DAY	MIN.		CONG.	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR. AREA Sq. Deg.		
674 HTPR	25	1438	1443	1510	S20	E72	.953	14579	31.0	32	-F		C	1443	30			Y5
	25	1520	1756	NO FLARE PATROL														
	25	2020	2043	NO FLARE PATROL														
	26	0611	0616	NO FLARE PATROL														
	26	1458	1646	NO FLARE PATROL														
	26	1938	1951	NO FLARE PATROL														
675 HTPR	27	1136	1144	1153	S23	E40	.694	14579	30.5	17	-F		C	1144	20	.3	E	Y5
676 HTPR	27	1303	1307	1316	S23	E39	.683	14579	30.5	13	-F		C	1307	10	.1	D	Y5
	27	1627	1638	NO FLARE PATROL														
	27	1758	1814	NO FLARE PATROL														
	27	1817	1822	NO FLARE PATROL														
677 RAMY	27	2012	2015	2020	S20	E35	.623	14579	30.5	8	-N	4	C		35		DE	Y5
	28	1315	1736	NO FLARE PATROL														
678 PALE	28	1801	1809	1820	S21	E27	.532	14579	30.8	19	-F	3	C		65		FDE	Y5
679 RAMY	28	1930E	1940U	2005D	S19	E25	.492	14579	30.7	35D	-F	3	C		65			Y5
680 VORO	29	0214	0220	0230	S13	E30	.522	14579	31.3	16	-N		C	0221	134	1.6	CDJ	Y5
681 CULG	29	0813	0821	0823D	S22	E25	.516	14579	31.2	10D	-N		P	0823	100	1.1		Y5
682 ATHN	29	0823	0828	0838	S25	E18	.474	14579	30.7	15	-N		V	0828	82	169.0		Y5
GRP63683	29	0850+1	0852	0915	S22	E21	.472	14579	30.9	25	-F						U	
ATHN	29	0850	0852	0906	S25	E18	.474	14579	30.7	16	-F		V	0852	66	134.0		
BUCA	29	0851		0924	S20	E24	.487	14579	31.2	33	-N		C	0900	107	1.3	U	
GRP63684	29	1138	1151	1210D	S20	E16	.397	14579	30.7	32	-F							
			1200															
RAMY	29	1138	1151	1158D	S22	E17	.430	14579	30.8	20D	-F	3	C		53			
RAMY	29	1155E	1200U	1210D	S19	E16	.385	14579	30.7	15D	-F	3	V		70			
685 HTPR	29	1333	1338	1343	S22	E09	.363	14579	30.2	10	-F		C	1338	30	.3	DH	Y5
686 HTPR	29	1350	1359	1411	S23	E21	.482	14579	31.2	21	-F		C	1359	10	.1	D	Y5
687 HTPR	29	1444	1445	1450	S20	E08	.326	14579	30.2	6	-F		C	1445	30	.3		Y5
688 HTPR	29	1512	1513	1530	S23	E20	.471	14579	31.1	18	-F		C	1513	10	.1		Y5
	29	1535	1543	NO FLARE PATROL														
	29	1647	1639	NO FLARE PATROL														
	29	1646	1834	NO FLARE PATROL														
GRP63689	30	0501+5	0515+3	05450	S22	E13	.391	14579	31.2	44	1F				240	2.6	EJL	
MITK	30	0501	0518	0630	S22	E10	.368	14579	31.0	89	1N		C	0518	200	2.2	E	
CULG	30	0506	0515	0545	S22	E13	.391	14579	31.2	39	1F		C	0523	280	2.8	JL	
MITK	30	0510	0514	0524	S29	E16	.505	14579	31.4	14	-F		C	0514	70	.8	E	
690 MITK	30	0605	0614	06500	S24	E13	.418	14579	31.2	45D	-N		C	0614	50	.6	E	Y5
	30	1800	1822	NO FLARE PATROL														
	30	1834	1950	NO FLARE PATROL														
	30	2205	2211	NO FLARE PATROL														
691 WEND	31	0858		0916	S20	W15	.353	14579	30.2	18	-N							Y5
	31	1236	1238	NO FLARE PATROL														
	31	1250	1313	NO FLARE PATROL														
692 MCMA	31	1812E		1830D	S23	W20	.469	14579	30.3	18D	-B		C	1821	40	.4	E	Y5
	31	1936	2000	NO FLARE PATROL														
	31	2017	2030	NO FLARE PATROL														
	31	2045	2058	NO FLARE PATROL														
	31	2103	2208	NO FLARE PATROL														
693 CULG	31	2223	2226	2310	S23	W13	.403	14579	31.0	47	1F		C	2235	200	2.0	J	Y5

"Remarks":

A = Eruptive prominence whose base is less than 90° from central meridian.
B = Probably the end of a more important flare.
C = Invisible 10 minutes before.
D = Brilliant point.
E = Two or more brilliant points.
F = Several eruptive centers.
G = No visible spots in the neighborhood.
H = Flare accompanied by a high speed dark filament.
I = Active region very extended.
J = Distinct variations of plage intensity before or after the flare.
K = Several intensity maxima.
L = Existing filaments show signs of sudden activity.
M = White-light flare.
N = Continuous spectrum shows effects of polarization.
O = Observations have been made in the calcium II lines H and K.
P = Flare shows helium D_3 in emission.
Q = Flare shows the Balmer continuum in emission.
R = Marked asymmetry in Hα line suggests ejection of high velocity material.
S = Brightness follows disappearance of filament (same position).
T = Region active all day.
U = Two bright branches, parallel (||) or converging (Y).
V = Occurrence of an explosive phase: important and abrupt expansion in about a minute with or without important intensity increase.
W = Great increase in area after time of maximum intensity.
X = Unusually wide Hα line.
Y = System of loop-type prominences.
Z = Major sunspot umbra covered by flare.

DECEMBER 1976

DAILY FLARE INDICES
Includes all Flares

Date	Flare Index	HR. OBS.	Date	Flare Index	HR. OBS.	Date	Flare Index	HR. OBS.
761201	0.00	18.5	761211	0.00	23.5	761221	0.00	20.0
761202	0.00	21.7	761212	0.00	22.6	761222	0.00	21.6
761203	0.00	19.7	761213	10.16	23.2	761223	0.00	22.3
761204	0.00	19.5	761214	21.42	23.1	761224	0.00	24.0
761205	0.00	20.3	761215	10.29	21.4	761225	1.91	20.8
761206	0.00	20.4	761216	4.07	22.0	761226	0.00	21.7
761207	0.00	23.9	761217	0.00	23.1	761227	7.23	23.5
761208	14.15	23.1	761218	0.00	20.8	761228	8.12	19.7
761209	47.27	19.6	761219	0.00	23.8	761229	38.11	21.5
761210	18.82	20.4	761220	0.00	19.4	761230	36.49	22.3
						761231	34.63	21.7

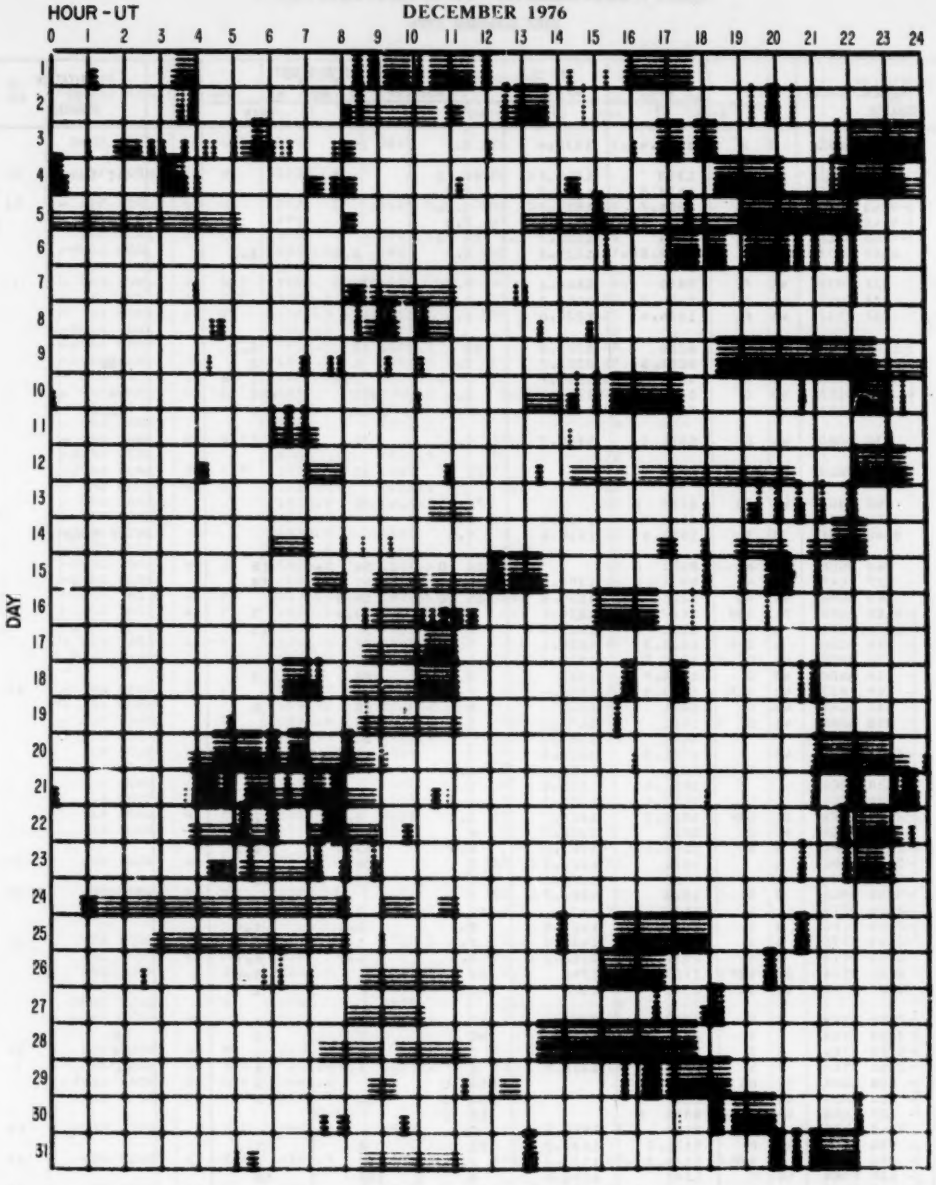
When no Flare Index is given, it is 0 for that day.

Errata: The data for Oct. 1976 in SGD issue 392 Part II p. 12 lacked the last day's data. The missing data are:

Date	Flare Index	HR OBS.
761031	0.00	15.5

INTERVALS OF NO FLARE PATROL OBSERVATION

FOR PRECEDING SOLAR FLARE TABLE



Observatories included in total patrol:

Athenes	Herstmonceux	Kodaikanal	Mitaka	Tehran
Bucharest	Huancayo	Locarno	Monte Mario	Upice
Catania	Hurbanovo	Lvov	Palehua	Voroshilov
Culgoora	Istanboul	Manila	Ramey	Wendelstein
Haute Provence	Kiev	McMath-Hulbert	Tachkent	

Times of no flare patrol are shown by the shaded area for each day divided into times of no cinematographic patrol (bottom half of day) and times of neither visual nor cinematographic patrol (top half of day).

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES
DECEMBER 1976

DEC 1976	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY MEAN	INT	POLARIZATION OR REMARKS
1	930	BORD	6 S	1033.4	1033.4	0.1	24	1		
3	9240	ARCE	23 GRF	1359	1445.5	80 D				AT SUNSET
	9240	ARCE	8 S	1458.5	1458.8	0.8				
	9240	ARCE	45 C	1501.7	1515.7	1.30				
	9240	ARCE		1501.7	1507.2	7.3				
	9240	ARCE		1509	1515.7	14 D				
	2800	OTTA	1 S	1622.5	1625.8	5.2	0.8	0.3		
8	237	TRST	41 F	0845	0845.1	0.2	279			
	237	TRST	41 F	1154.2	1154.3	0.3	38			
	237	TRST	41 F	1234.4	1234.6	1.4	140			
9	1000	TYKW	45 C	0200	0201.8	10	12	0.7		
	2000	TYKW	45 C	0201.6	0202.7	3.5	6	2		20L
	3750	TYKW	5 S	0202 E	0202.7	2 D	3.5	1 D		
	200	HIRA	45 C	0203.2	0204.4	3.5	900	250		WR
	100	HIRA	45 C	0204	0206	2.5	1200	100		WRWL
10	930	BORD	46 C	0814.3	0814.3	0.4	31	2		
11	260	ONDR	43 NS	0820		320	13			
13	260	ONDR	44 NS	0818 E		470 D	19			
	9240	ARCE	1 S	1411.7	1411.9	0.6				
	9240	ARCE	3 S	1516.3	1516.6	0.6				AT SUNSET
14	260	ONDR	44 NS	0800 E		331 D	54	16		
	127	TORN	43 NS	0930 U	1308.8	270 D	41	10		
	245	SGMR	44 NS	1211 E	1859.9	535 D	15.4			
	9100	GORK	21 GRF	1019	1024.5	9.5	9.9	5		
	9100	GORK	3 S	1022	1022.5	3	37	18		
	650	GORK	4 S/F	1020.3	1024.6	5.4	122			
	536	ONDR	45 C	1020.7	1022.9	3.5	123	7		
	808	ONDR	45 C	1020.7	1023	7	90	5		
	408	TRST	42 SER	1020.9	1023.4	3.6	140			
	930	BORD	46 C	1021	1023	4	70	5		
	950	GORK	46 C	1021	1022.2	5.5	24			
	950	GORK		1021	1023.6		34			
	1470	BERL	46	1021.5	1023.5	3	9.4	3.7		
	1420	ARCE	46 C	1021.6	1021.9	3.2				
	1420	ARCE		1021.6	1021.9	1				
	1420	ARCE		1022.6	1023.3	2.2				
	2950	GORK	21 GRF	1021.9	1024.7	3.9	3.6	2.2		
	260	ONDR	45 C	1021	1022.7	4	155	20		
	2950	GORK	3 S	1022.8	1023.6	1.9	19.8	6.7		
	3800	BERL	4	1022	1023.5	3	20	8.1		
	9500	BERL	4	1023	1023.5	7	75	32		
	9240	ARCE	3 S	1023	1023.7	5				
	2800	OTTA	1A S	1426	1430	10	0.6	0.3		
	2800	OTTA	8 S	1427.5	1427.5	0.5	6.4	1.6		
	2800	OTTA	8 S	1436.8	1436.8	0.5	1.4	0.7		
	2800	OTTA	8 S	1512	1212.2	0.5	1.4	0.7		
	2800	OTTA	22 GRF	1725	1745	55	1	0.6		
	2800	OTTA	20 GRF	1914	1923	40	2	1		
15	2000	TYKW	5 S	0257	0305	16	2	1.2		0L
	3750	TYKW	5 S	0300	0310	40	2	1		0R
	3750	TYKW	5 S	0307.8	0308.3	1	4	1		0R
	2000	TYKW	5 S	0307.8	0308.3	1	3.5	1		0L
	100	GORK	44 NS	0621 E		509 D		5		
	260	ONDR	44 NS	0837 E		333 D	24	3		
	127	TORN	44 NS	0850 E		310 D				
	9240	ARCE	1 S	0859	0859.5	1.1				
	536	ONDR	48 F	1131.6	1136.2	32	8	1		
	808	ONDR	2 S/F	1134.2	1135.3	2.5	12	6		
	127	TORN	45 C	1141	1142.5	3	150	18		
	127	TORN	24 R	1200 U	1213	120 D	14	13		
	408	TRST	41 F	1220.8	1220.8	0.7	320			
	7800	SAOP	28 PRE	1456.8	1457.6	1.6	7.3	2.8		
	7000	SAOP	4 SF	1458.4	1459.2	3.8	40.9	15		
	7800	SAOP	29 PBI	1502.2		6.8		2		
	8800	SGMR	3 S	1458.5	1458.8	1.8	26	14		SWF
	2800	OTTA	1 S	1458.5	1459.2	1.5	9.6	5		
	2800	OTTA	29 PBI	1500	1500	5	1.6	0.8		
	4995	SGMR	3 S	1458.5	1459.1	9.3	34.8	14		SWF
	9400	HUAN	3 S	1458.5	1500	1.5	17.4	8.5		
	9400	HUAN	21 GRF	1458.5	1512.6	4.1	6.3	1.6		
	15400	SGMR	1 S	1458.9	1459.2	2.4	7.2	2.9		SWF
	4995	BOUL	8 S	1458	1458.5	5	31	10		
	2695	BOUL	8 S	1459.5	1500	2	8	2		
	18	MCMA	42 SER	1503	1507	10			1	
	2800	OTTA	26 FAL	1508	1526	18	-1.4	-0.7		
	2800	OTTA	20 GRF	1655	1712	35	0.6	0.3		

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

DECEMBER 1976

DEC 1976	FREQUENCY	STATION	TYPE		STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY MEAN	INT	POLARIZATION OR REMARKS
	2695	PENT	20	GRF	2000	2030	120	1.6	1		
16	127	TORN	44	NS	0720 E		400 D				
17	127	TORN	44	NS	0720 E	0835.9	400 D	45			
	100	GORK	43	NS	0729		61		5		
	127	TORN	45	C	0741	0741.9	2.5	24	10		
	9500	BERL	3		0956.5	1027	109	7.8			
	930	BORD	40	F	1005	1011.4	33	49	4		
	950	GORK	23	GRF	1005 E	1015 U	34	9.5			
	237	TRST	42	SER	1005.1	1005.6	25.5	62			
	100	GORK	41	F	1005.5	1007.1	192	625			
	1000	GORK			1005.5	1012.2		470			
	1000	GORK			1005.5	1024.3		140			
	1470	BERL	4		1005.5	1007.4	115	17			
	408	TRST	27	RF	1005.9	1018.5	23	28			
	950	GORK	46	C	1006	1009.6	8.1	18			
	950	GORK			1006	1011.5		25			
	950	GORK			1006	1013.2		9			
	650	GORK	23	GRF	1006		33.1				
	3000	BERL	4		1006	1007.5	74	10			
	2950	GORK	21	GRF	1006 C	1009	20.8	7.8	2.7		
	650	GORK	46	C	1010.8	1011.6	4.8	62			
	650	GORK			1010.8	1013.3		45			
	127	TORN	45	C	1015.3		10	60 D	30 U		
	3000	BERL	4		1023.5	1024	2	30			
	1470	BERL	4		1023.5	1024.2	1.5	9.8			
	2950	GORK	45	C	1024.2	1024.4	2.8	42	5.8		
	2950	GORK			1024.2	1025.3		19			
	237	TRST	41	F	1026.2	1026.5	0.3	158			
	237	TRST	41	F	1028.6	1028.8	0.4	275			
	1470	BERL	4		1032	1033	8	6.6			
	408	TRST	41	F	1041.4	1041.7	0.6	64			
	7000	SAOP	20	GRF	1451.2		25		0.7		
18	100	GORK	41	F	0756.2	0756.4	2.3	30			
	100	GORK			0756.2	0757.7		30			
	127	TORN	8	S	0812.4	0812.7	0.9	48	28		
	100	GORK	6	S	0812.8	0812.9	0.7	30			
	18	MCMA	6	S	1350 E	1353	5				
	18	MCMA	6	S	1418	1419	3				
	18	MCMA	6	S	1455	1456	2				
	18	MCMA	42	SER	1503	1507	5				
	18	MCMA	41	F	2210	2218	12				
	18	MCMA	6	S	2231	2233	3				
19	260	ONDR	44	NS	0810 E		390 D	18			
20	260	ONDR	44	NS	0800 E		356 D	5			
	100	GORK	6	S	0849	0849.2	0.5	90			
21	950	GORK	1	S	0745.5	0745.6	0.2	3.3			
	260	ONDR	44	NS	0800 E		369 D	10			
	650	GORK	1	S	0845.6	0845.6	0.5	17.7	8		
	245	SGMR	6	S	1521.2	1521.6	.5	7	1.4		
	2695	BOUL	8	S	1849	1900	2.5	9	3		
	4995	BOUL	45	C	1901	1902.5	2.5	10	3		
22	127	TORN	44	NS	0730 E	1029.4	380 D	55			
	260	ONDR	42	SER	1144.6	1203.2	23	13			
	7000	SAOP	20	GRF	1401.8		70		4		
	7000	SAOP	20	GRF	1505.2		24.8		1.5		
23	2800	OTTA	2	S/F	1502.9	1503	1	3.6	0.8		
24	606	SGMR	22	GRF	1909.5	1936.1	44.9	15.9	9.5		
25	127	TORN	41	F	1337	1347 U	13 D	52			
	2800	OTTA	21	GRF	1432	1501	85	1.2	0.8		
	2800	OTTA	1	S	1440.5	1442.3	3.5	1	0.4		
	2800	OTTA	240	R	1625	1641	16	1	0.5		
	2800	OTTA	24P	R	1641		180 D	1			
26	18	MCMA	6	S	1528	1529	5				
27	1000	TYKW	5	S	0607	0607.3	1.5	1.5	0.5		
	260	ONDR	44	NS	0815		351	30			
28	260	ONDR	44	NS	0810 E		360 D	9			
	18	MCMA	41	F	1455	1458	10				
	18	MCMA	42	SER	1520	1530	21				
	18	MCMA	42	SER	1548	1550	6				
	18	MCMA	42	SER	1600	1613	20				
	2800	OTTA	20	GRF	1730	1835	160	5.4	2.7		
	18	MCMA	42	SER	1826	1828	7				

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

DECEMBER 1976

DEC 1976	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY MEAN	INT	POLARIZATION OR REMARKS
	18	MCMA	42 SER	1845	1852	52			1	
29	260	ONDR	44 NS	0820 E		353 D	44			
	160	OWIN	44 NS	1129 E		181 D		1		
	172	OWIN	44 NS	1129 E		181 D		2		
	242	OWIN	45 C	1331.5	1333	2	60	5		
	242	OWIN	45 C	1335	1338	4	50	5		
	4995	BOUL	45 C	1811	1819	8	163	27		
	2695	BOUL	45 C	1815	1819	6	163	25		
30	2800	TYKW	29 GRF	0500	0515	70 D	2.6	1.80		OL
	3750	TYKW	29 GRF	0500	0530	70 D	3	2 D		OR
	9400	TYKW	29 GRF	0500	0530	70 D	5	3 D		OR
	260	ONDR	44 NS	0810 E		190 D	11			
	127	TORN	44 NS	0826 E		105 D				
	18	MCMA	6 S	1516	1513	11			2	
	18	MCMA	41 F	1522	1525	9			1	
31	200	HIRA	45 C	0140	0140.5	1	300	90		WR
	100	HIRA	45 C	0140	0140.2	1	550	200		WRWL
	127	TORN	45 C	0901	0901.5	3	65	15		
	237	TRST	41 F	0901.2	0901.4	0.4	122			0
	2800	OTTA	27A RF	1602		248	2	1.5		
	2800	OTTA	24 R	1602	1622	20	2	1		
	2800	OTTA	2 S/F	1606	1609.3	9	9.2	2.5		
	4995	BOUL	3 S	1608.5	1609	3.5	11	4		
	2695	BOUL	8 S	1610	1610.5	1	6	2		
	2800	OTTA	24P R	1622		125	2			
	2800	OTTA	1 S	1801.5	1802.5	4.5	1	0.5		
	18	MCMA	6 S	1804	1805	2			1	
	2800	OTTA	21 GRF	1812		16	1.4	0.7		
	245	SGMR	6 S	1813.2	1815.8	4.4	146.5	44		
	8800	SGMR	4 S/F	1814.1	1814.5	9.8	50.7	15.2		
	2695	SGMR	4 S/F	1814.4	1815.3	8.2	47.9	14.4		
	1415	SGMR	1 S	1814.4	1815.3	2.4	7.8	2.3		
	4995	SGMR	4 S/F	1814.9	1815.7	12.4	93.7	28.1		
	410	SGMR	6 S	1814.9	1816	1.9	59.9	23.9		
	1420	BOUL	8 S	1814	1815.5	3.5	7	2		
	606	SGMR	3 S	1815	1815.8	1.9	19.4	5.8		
	9400	HUAN	3 S	1815	1818.1	3.1	49.3	26		
	9400	HUAN	29 PBI	1816.1	1834.8	16.7	12.7	3.9		
	2695	BOUL	8 S	1815.5	1817	3.5	41	13		
	2800	OTTA	4 S/F	1815	1815.8	4	48	16		
	4995	BOUL	8 S	1815	1815.5	4.5	40	13		
	2800	OTTA	26 FAL	1827	2010	103	-2	-1		

Reports received from the following observatories:

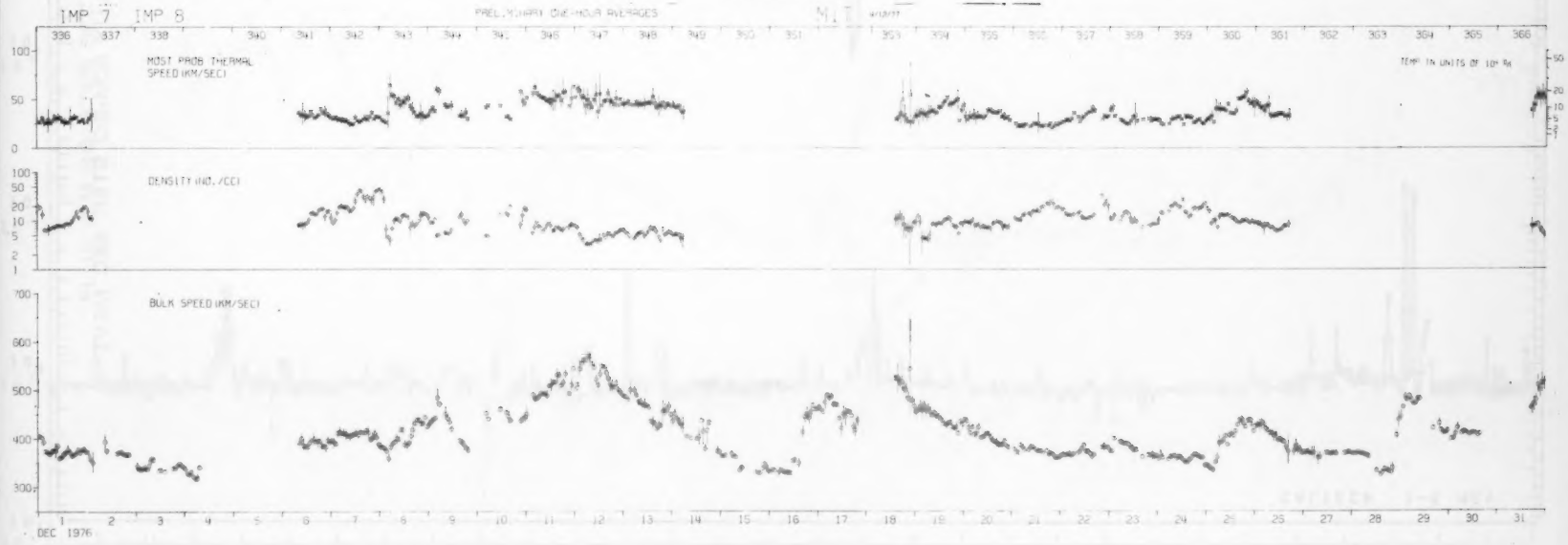
ARCE = Arcetri
BERL = Berlin-Adlershof
BORD = Bordeaux
BOUL = Boulder
CRIM = Simferopol
DWIN = Dwingeloo
GORK = Gorky
HARS = Harestua
HIRA = Hiraiso
HUAN = Huancayo
IRKU = Irkutsk
KIEV = Kiev
MANI = Manila
MCMA = McMath-Hulbert
ONDR = Ondrejov
OTTA = Ottawa
PENT = Penticton
POTS = Potsdam
SAOP = Sao Paulo
SGMR = Sagamore Hill
SYDN = Sydney
TORN = Torun
TYKW = Toyokawa
TRST = Trieste
VORO = Voroshilov (Ussurisk)

Explanation of Type Code:

1 Simple 1
2 Simple 1F
3 Simple 2
4 Simple 2F
5 Simple
6 Minor
7 Minor +
8 Spike
20 Simple 3
21 Simple 3A
22 Simple 3F
23 Simple 3AF
24 Rise
25 Rise A
26 Fall
27 Rise and Fall
28 Precursor
29 Post Burst Increase
30 Post Burst Increase A
31 Post Burst Decrease
32 Absorption
40 Fluctuation
41 Group of Bursts
42 Series of Bursts
43 Onset of Noise Storm
44 Noise Storm in Progress
45 Complex
46 Complex F
47 Great Burst
48 Major
49 Major +

IMP 7 AND 8 SOLAR WIND PLASMA

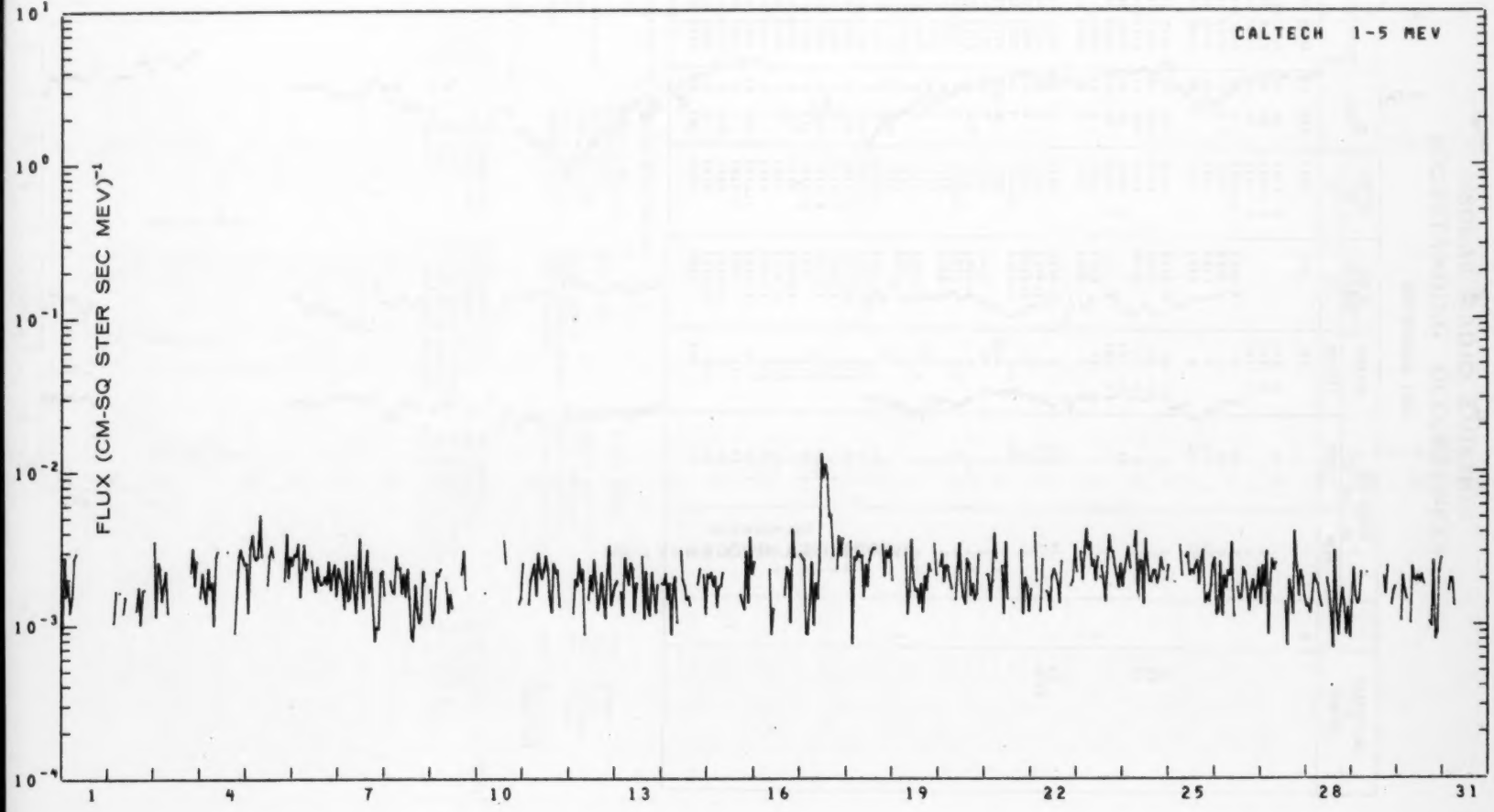
DECEMBER 1976



17
Dec 76

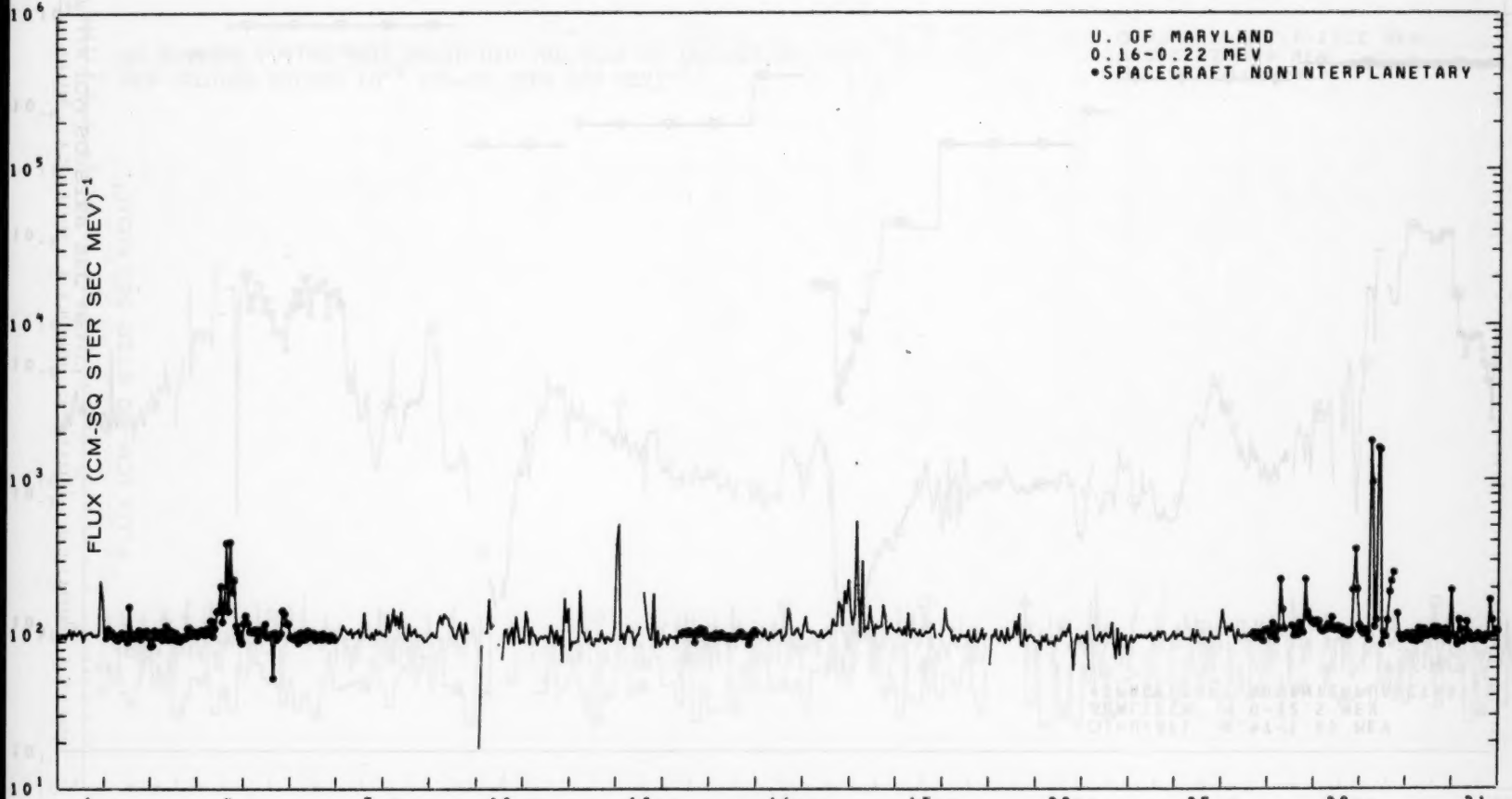
IMP 7 AND 8 ELECTRONS

DECEMBER, 1976



IMP 7 AND 8 LOW ENERGY PROTONS

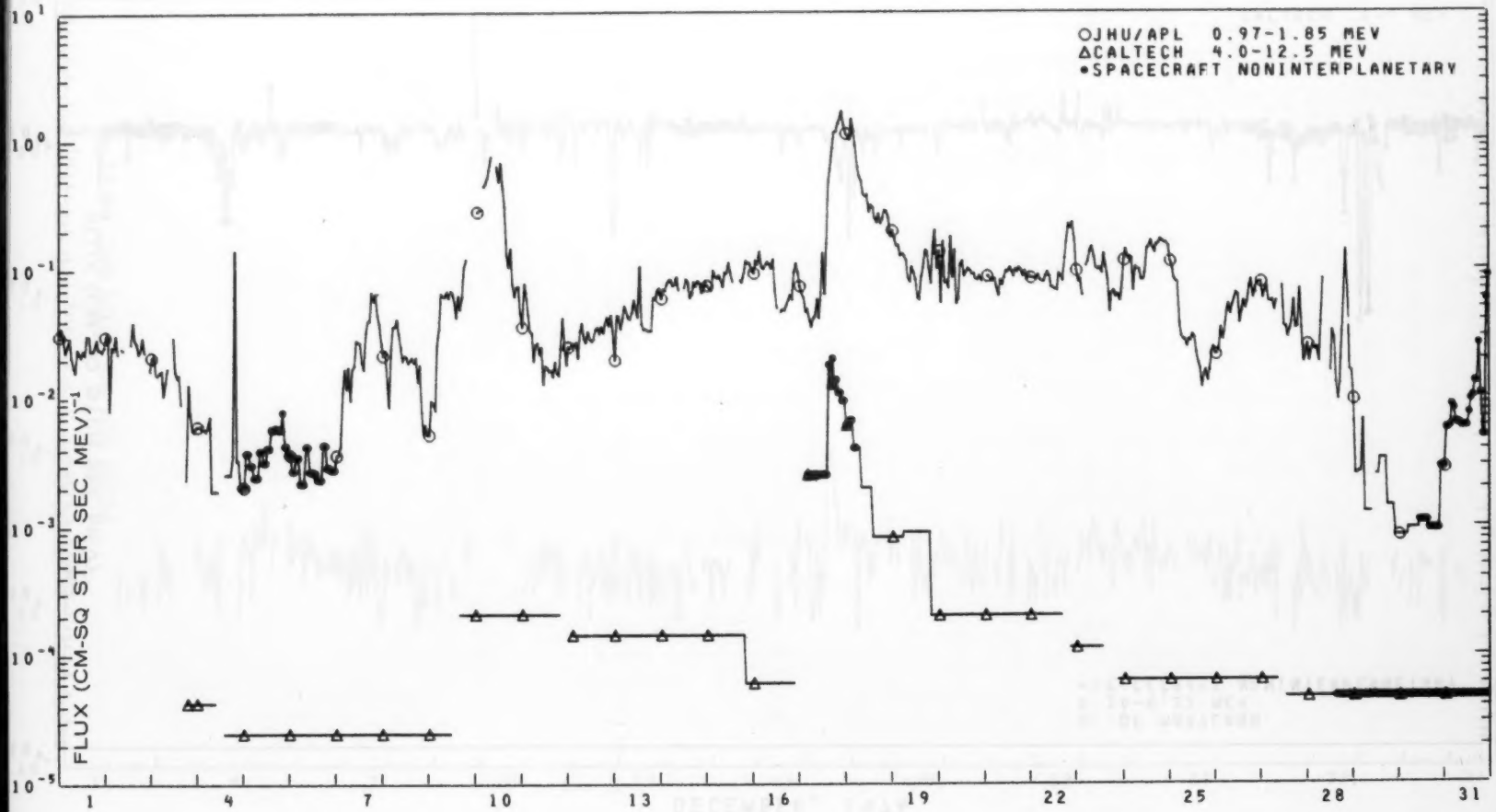
DECEMBER, 1976



19 Dec 76

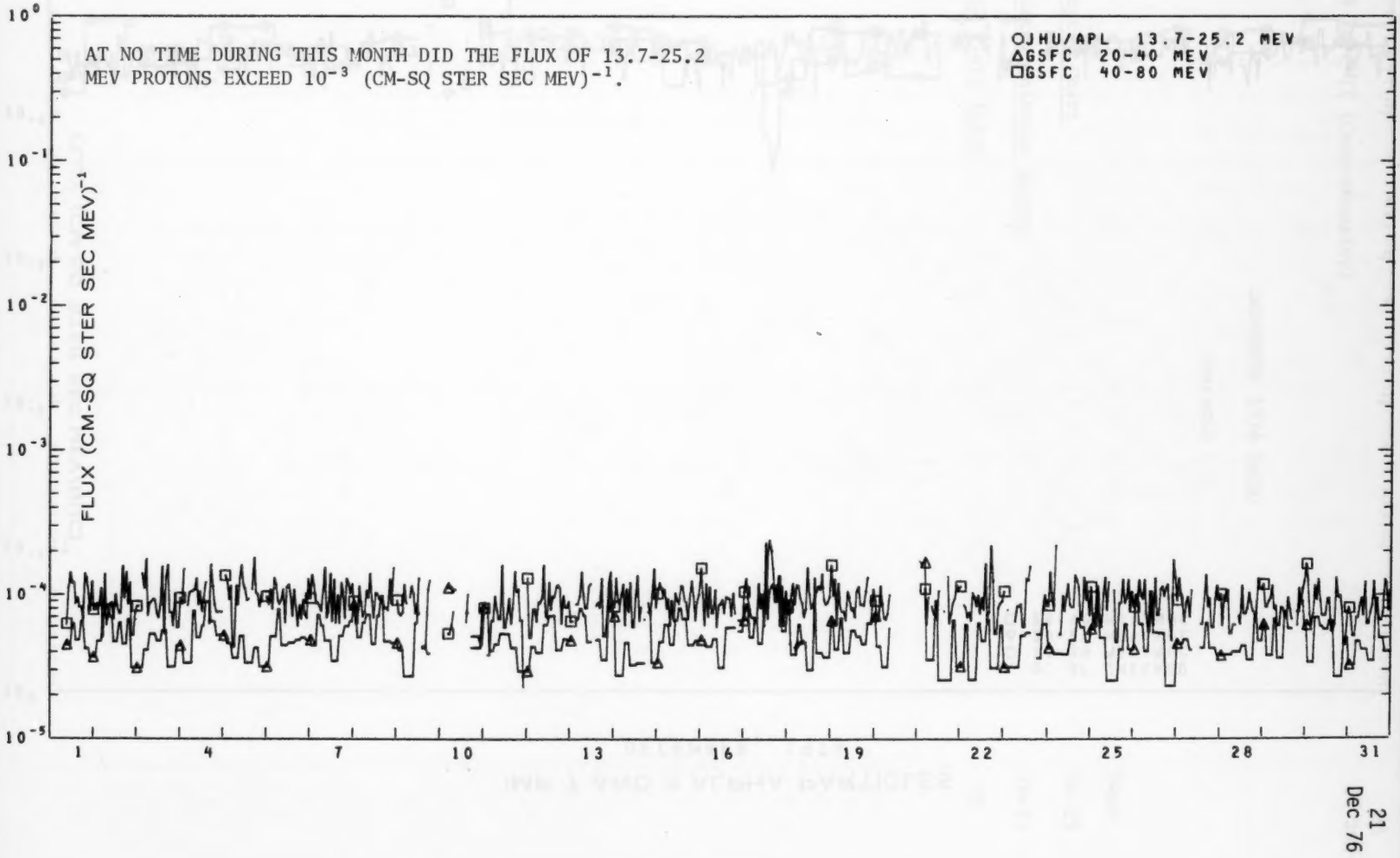
IMP 7 AND 8 INTERMEDIATE ENERGY PROTONS

DECEMBER, 1976



IMP 7 AND 8 HIGH ENERGY PROTONS

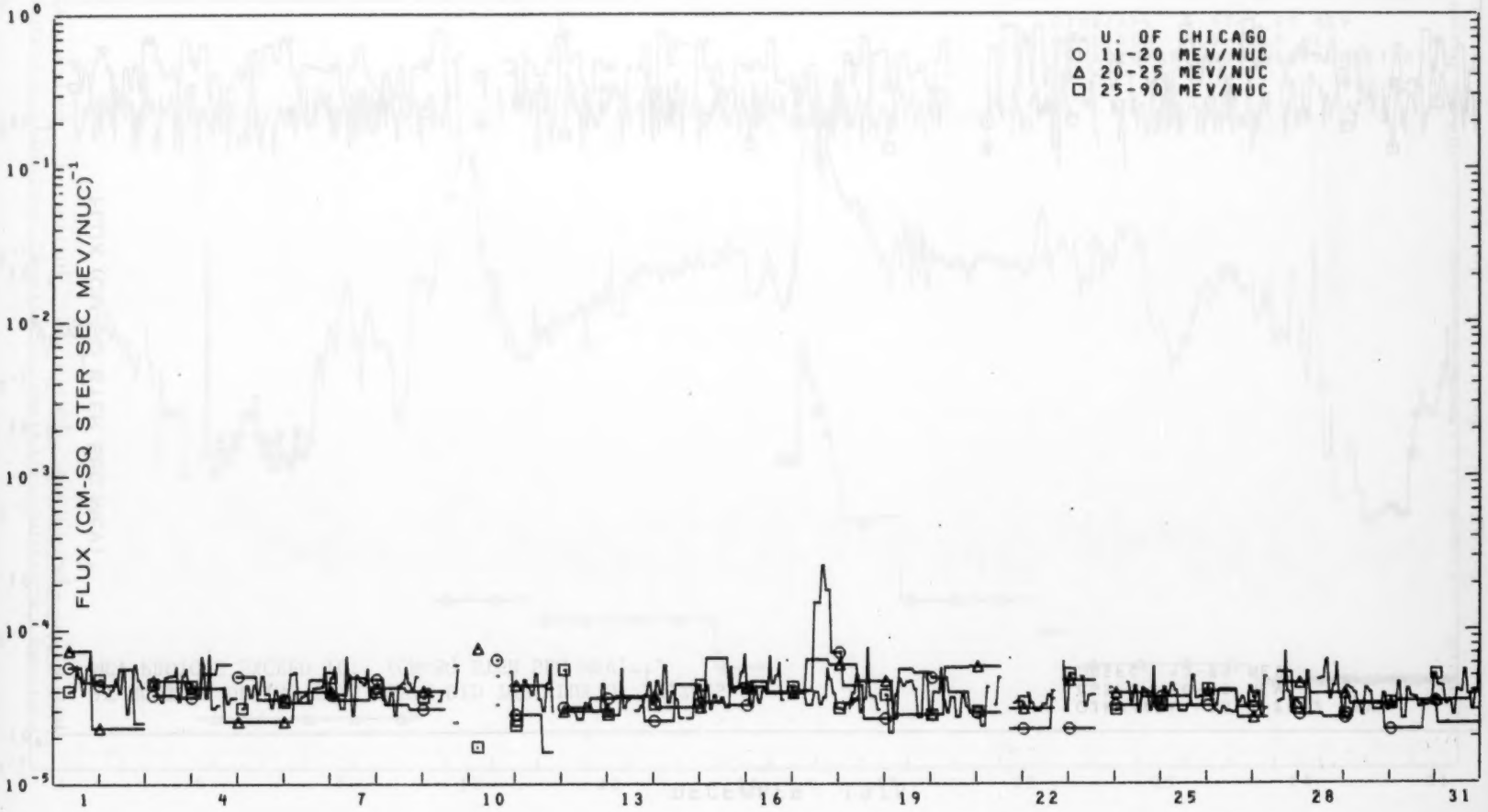
DECEMBER, 1976



22 Dec 76

IMP 7 AND 8 ALPHA PARTICLES

DECEMBER, 1976



NOVEMBER 1976 DATA

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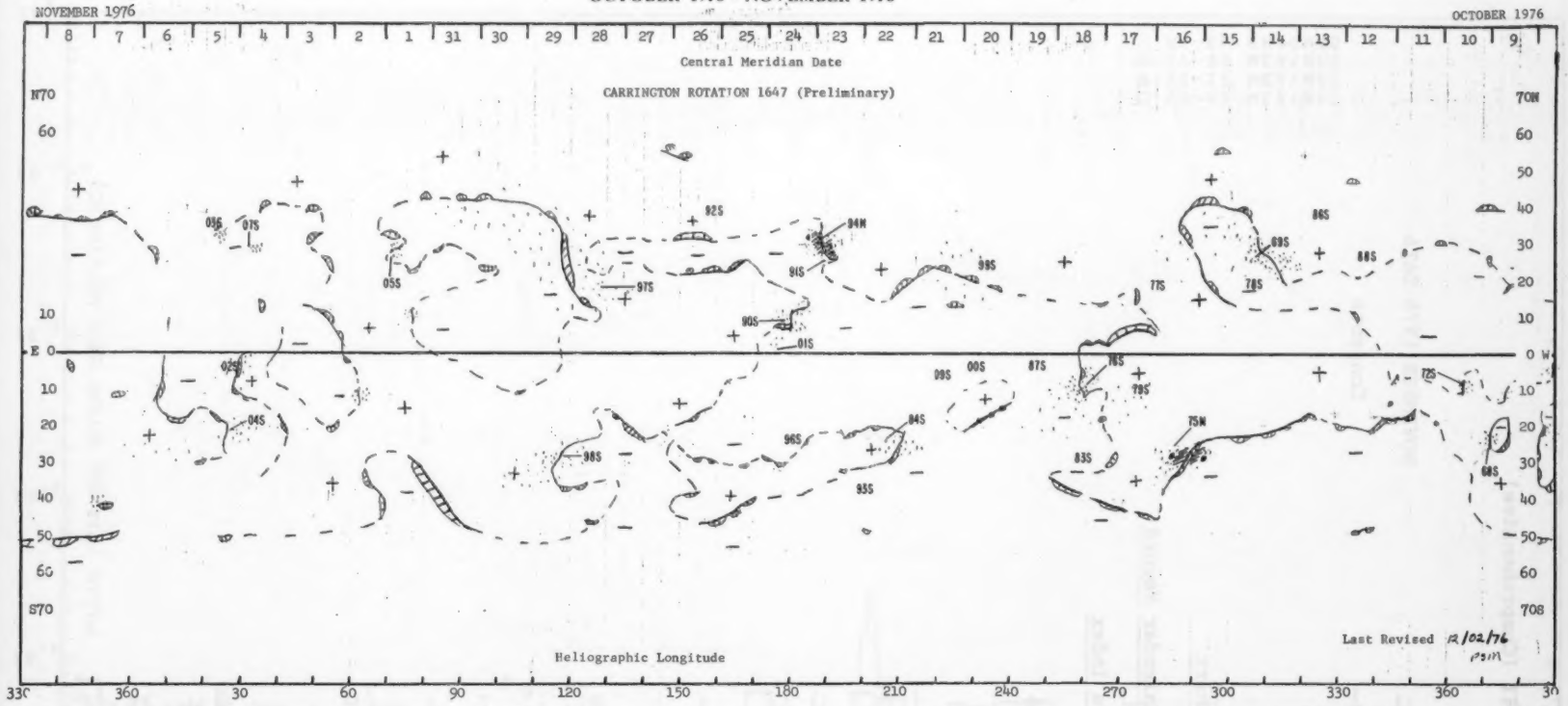
24 Nov 76

ABBREVIATED CALENDAR RECORD

Hα SYNOPTIC CHART

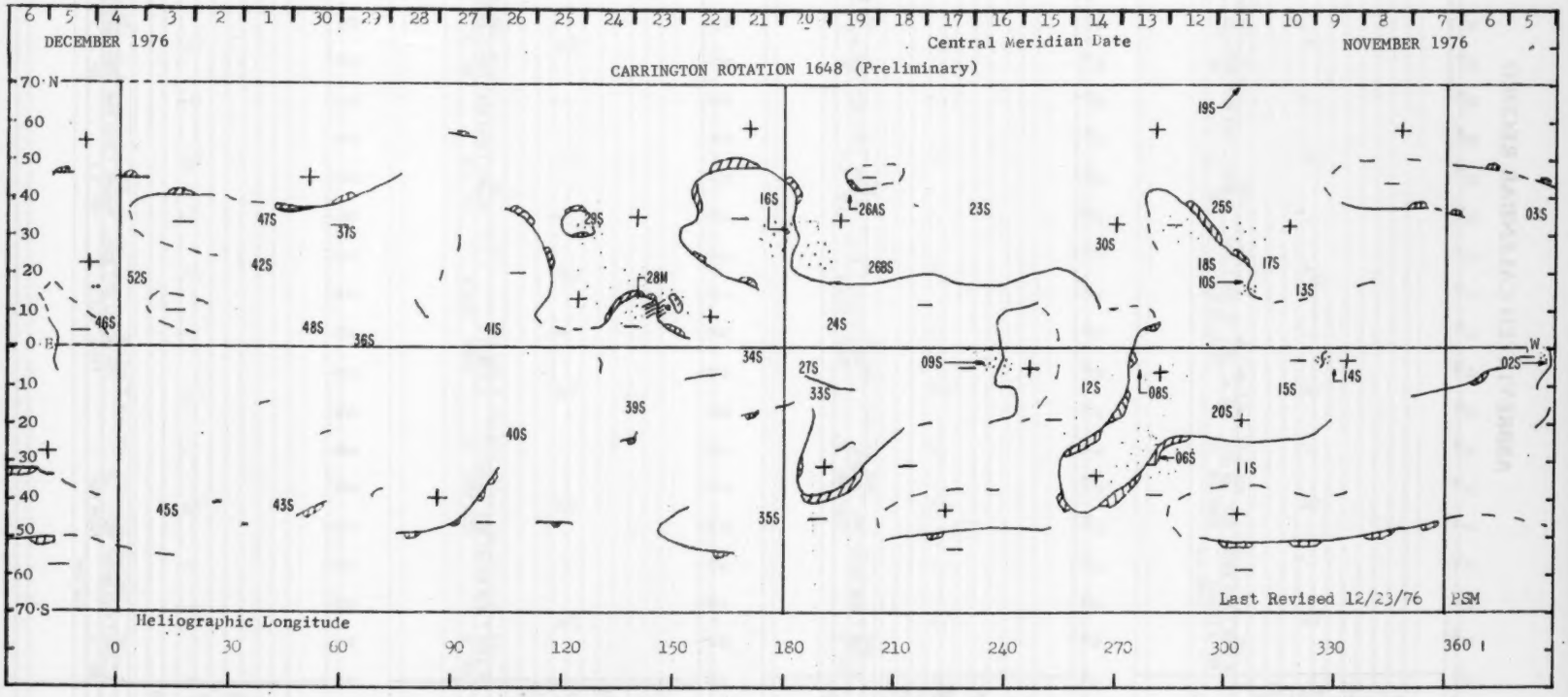
OCTOBER 1976 - NOVEMBER 1976



ABBREVIATED CALENDAR RECORD

Hα SYNOPTIC CHART

NOVEMBER 1976 - DECEMBER 1976



25 Nov 76

ABBREVIATED CALENDAR RECORD

Nov. 1, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES		
Bursts	cm	
	dm	
	m	
	Dkm	
SID		
X-Rays		
Ap 10	Kp	4- | 3- | 3- | 3- | 1o | 1o | 2+ | 2+
	sc	
Aurora	USSR	
	W.E.	
Cosmic Rays		
Green Corona		E. Limb 7 days earlier: NE- no data SE- no data W. Limb 7 days later: NW- SW-
Indices		Rz: 0 (Final) 10cm flux: 72 Flare: 0/22.1 Ca: 1.4 Ip: 0 Ia: 3
Solar Regions		14505 N26
Sunspots		

Nov. 2, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES		
Bursts	cm	|
	dm	
	m	
	Dkm	
SID		
X-Rays		
Ap 7	Kp	2+ | 3- | 2o | 1+ | 2- | 2+ | 2- | 1o
	sc	
Aurora	USSR	
	W.E.	
Cosmic Rays		
Green Corona		E. Limb 7 days earlier: NE- no data SE no data W. Limb 7 days later: NW- no data SW- no data
Indices		Rz: 0 10cm flux: 70 Flare: 0/14.2 Ca: 1.3 Ip: 0 Ia: 2
Solar Regions		
Sunspots		

Nov. 3, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES		
Bursts	cm	
	dm	
	m	
	Dkm	
SID		
X-Rays		
Ap 6	Kp	2+ | 1o | 2o | 1+ | 1- | 1+ | 1o | 3o
	sc	
Aurora	USSR	
	W.E.	
Cosmic Rays		
Green Corona		E. Limb 7 days earlier: NE- no data 5° SE- W. Limb 7 days later: NW- no data SW- no data
Indices		Rz: 0 10cm flux: 71 Flare: 0/19.9 Ca: 0.6 Ip: 0 Ia: 1
Solar Regions		
Sunspots		

Nov. 4, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES		
Bursts	cm	
	dm	
	m	
	Dkm	
SID		
X-Rays		
Ap 4 Q8	Kp	1+ | 1o | 2- | 1+ | 0+ | 1- | 1+ | 1+
	sc	
Aurora	USSR	
	W.E.	
Cosmic Rays		
Green Corona		E. Limb 7 days earlier: NE- SE no data 95°, 145° W. Limb 7 days later: NW- no data SW- no data
Indices		Rz: 0 10cm flux: 71 Flare: 0/22.5 Ca: 0.3 Ip: 0 Ia: 3
Solar Regions		14507 N29
Sunspots		

Nov. 5, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES		
Bursts	cm	
	dm	
	m	
	Dkm	
SID		
X-Rays		
Ap 3 Q3	Kp	0+ | 1- | 1+ | 1+ | 1- | 1- | 0+ | 0o
	sc	
Aurora	USSR	
	W.E.	
Cosmic Rays		
Green Corona		E. Limb 7 days earlier: NE- no data SE- no data W. Limb 7 days later: NW- SW-
Indices		Rz: 0 10cm flux: 72 Flare: 0/18.8 Ca: no data Ip: 0 Ia: 3
Solar Regions		(14504) S21 (30 (14502) S03 (14503) N35
Sunspots		

Nov. 6, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES		
Bursts	cm	
	dm	
	m	
	Dkm	
SID		
X-Rays		
Ap 2 Q2	Kp	0+ | 0+ | 1o | 0+ | 0o | 0o | 1- | 0+
	sc	
Aurora	USSR	
	W.E.	
Cosmic Rays		
Green Corona		E. Limb 7 days earlier: NE- SE W. Limb 7 days later: NW- SW-
Indices		Rz: 0 10cm flux: 71 Flare: 0/17.1 Ca: 0.0 Ip: 0 Ia: 3
Solar Regions		
Sunspots		

Nov. 7, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES		
Bursts	cm	
	dm	
	m	
	Dkm	
SID		
X-Rays		
Ap 3 Q7	Kp	0o | 2+ | 2- | 1o | 0+ | 0+ | 0o | 0+
	sc	
Aurora	USSR	
	W.E.	
Cosmic Rays		
Green Corona		E. Limb 7 days earlier: NE- no data SE- no data W. Limb 7 days later: NW- no data 315°-355° SW-
Indices		Rz: 0 10cm flux: 71 Flare: 0/18.2 Ca: 0.2 Ip: 0 Ia: 4
Solar Regions		
Sunspots		

Nov. 8, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES		
Bursts	cm	
	dm	
	m	
	Dkm	
SID		
X-Rays		
Ap 6	Kp	1o | 1- | 0o | 0+ | 1- | 2o | 2+ | 3+
	sc	
Aurora	USSR	
	W.E.	
Cosmic Rays		
Green Corona		E. Limb 7 days earlier: NE- no data SE no data W. Limb 7 days later: NW- no data 300°-355° SW-
Indices		Rz: 0 10cm flux: 71 Flare: 0/20.9 Ca: 0.3 Ip: 0 Ia: 2
Solar Regions		
Sunspots		

Nov. 9, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES		
Bursts	cm	
	dm	
	m	
	Dkm	
SID		
X-Rays		
Ap 8	Kp	3- 3+ 2- 2- 2- 1o 1o 2o
	sc	
Aurora	USSR	
	W.E.	
Cosmic Rays		
Green Corona		E. Limb 7 days earlier: NE- SE- W. Limb 7 days later: NW- no data SW- no data
Indices		Rz: 0 10cm flux: 72 Flare: 0/22.3 Ca: 0.3 Ip: 0 Ia: 1
Solar Regions		(14514) S05
Sunspots		

Nov. 10, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES		
Bursts	cm	
	dm	
	m	
	Dkm	
SID		
X-Rays		
Ap 18 D4	Kp	2+ 3o 3o 3- 3- 3- 4+ 5-
	sc	
Aurora	USSR	ϕ = 58° 1300 and 2100 (R,R2)
	W.E.	
Cosmic Rays		
Green Corona		E. Limb 7 days earlier: NE- SE W. Limb 7 days later: NW- no data SW- no data
Indices		Rz: 0 10cm flux: 71 Flare: 0/14.4 Ca: 0.5 Ip: 0 Ia: 2
Solar Regions		(14513) N16 (14515) S10 (14517) N23
Sunspots		

Nov. 11, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES		
Bursts	cm	
	dm	
	m	
	Dkm	
SID		
X-Rays		
Ap 23 D3	Kp	3o 4- 3- 3o 4o 5o 4+ 3-
	sc	
Aurora	USSR	ϕ = 60° 1400-1600 (HA2-3) and ϕ = 59° 1600-1700 (HA1)
	W.E.	
Cosmic Rays		
Green Corona		E. Limb 7 days earlier: NE- SE- W. Limb 7 days later: NW- no data SW- no data
Indices		Rz: 0 10cm flux: 72 Flare: 0/16.6 Ca: 1.2 Ip: 0 Ia: 5
Solar Regions		(14511) S32 (14510) N18 (14519) N70 (14520) S16 (14525) N37
Sunspots		

Nov. 12, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES		
Bursts	cm	
	dm	
	m	
	Dkm	
SID		
X-Rays		
Ap 24 D2	Kp	5+ 3o 3o 3o 3+ 3+ 4- 4+
	sc	
Aurora	USSR	
	W.E.	
Cosmic Rays		
Green Corona		E. Limb 7 days earlier: NE- SE W. Limb 7 days later: NW- SW-
Indices		Rz: 0 10cm flux: 72 Flare: 0/18.9 Ca: 2.6 Ip: 0 Ia: 4
Solar Regions		(14518) N23
Sunspots		

Nov. 13, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES		
Bursts	cm	
	dm	
	m	
	Dkm	
SID		
X-Rays		
Ap 31 D1	Kp	4+ | 4o | 5o | 4+ | 4+ | 4+ | 4+ | 3-
	sc	
Aurora	USSR	
	W.E.	
Cosmic Rays		
Green Corona		E. Limb 7 days earlier: NE- no data SE- no data W. Limb 7 days later: NW- no data SW- no data
Indices		Rz: 0 10cm flux: 71 Flare: 0/20.1 Ca: 1.7 Ip: 0 Ia: 6
Solar Regions		14506 S29 (2) (14508) S05
Sunspots		

Nov. 14, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

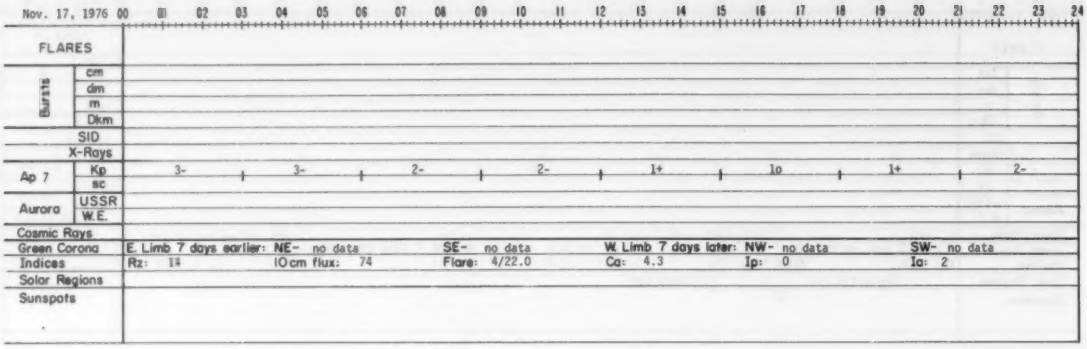
FLARES		
Bursts	cm	
	dm	
	m	
	Dkm	
SID		
X-Rays		
Ap16 D5*	Kp	4- | 2- | 2o | 2+ | 4- | 4- | 4o | 3-
	sc	
Aurora	USSR	ϕ = 59° 1200-1500 (HB1)
	W.E.	
Cosmic Rays		
Green Corona		E. Limb 7 days earlier: NE- SE W. Limb 7 days later: NW- SW-
Indices		Rz: 0 10cm flux: 71 Flare: 0/21.1 Ca: 2.1 Ip: 0 Ia: 4
Solar Regions		(14530) N27 (14512) S10
Sunspots		

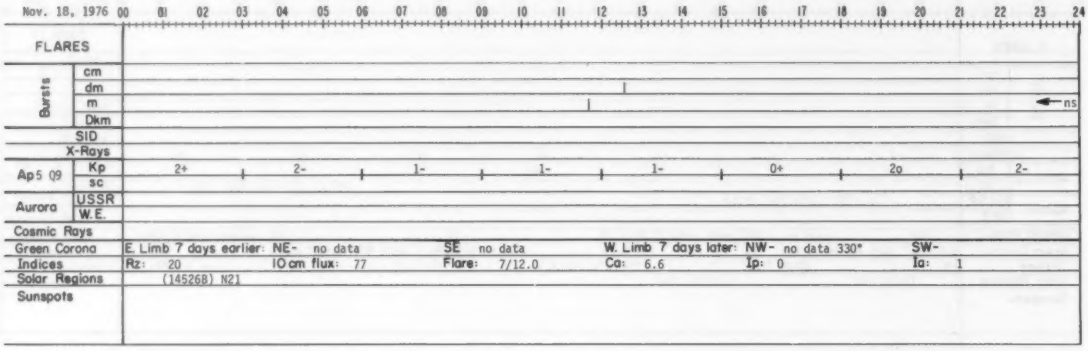
Nov. 15, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

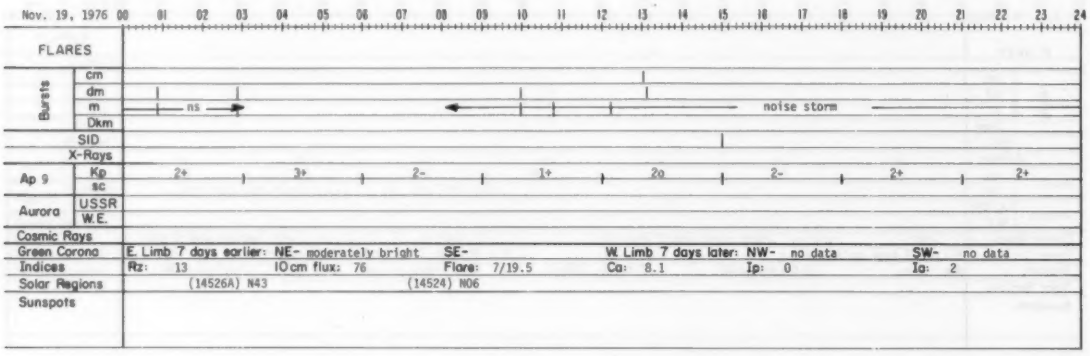
FLARES		
Bursts	cm	
	dm	
	m	
	Dkm	
SID		
X-Rays		
Ap 9	Kp	3o | 3- | 1+ | 2o | 3- | 3- | 2o | 1-
	sc	
Aurora	USSR	
	W.E.	
Cosmic Rays		
Green Corona		E. Limb 7 days earlier: NE- SE- W. Limb 7 days later: NW- no data SW- no data
Indices		Rz: 7 10cm flux: 73 Flare: 0/21.1 Ca: 3.6 Ip: 0 Ia: 5
Solar Regions		
Sunspots		

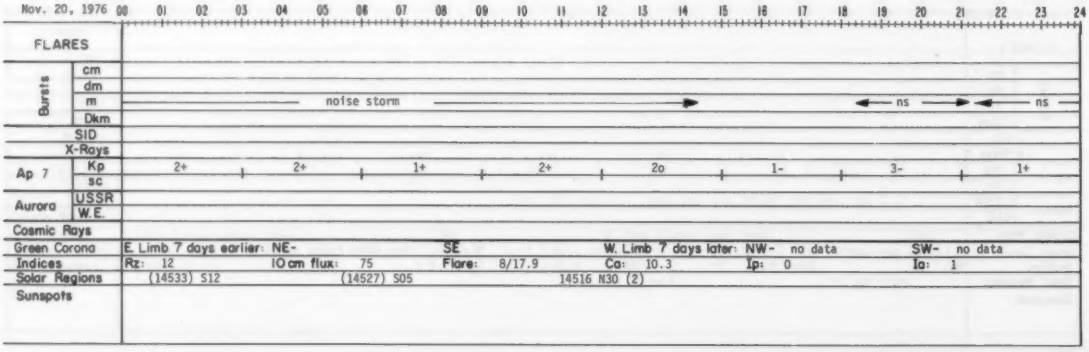
Nov. 16, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES		
Bursts	cm	
	dm	
	m	
	Dkm	
SID		
X-Rays		
Ap 5	Kp	1- | 2- | 2- | 1+ | 2o | 2- | 1o | 1+
	sc	
Aurora	USSR	ϕ = 59° 1400-1500 (R:B2) and 1600 (HB1), ϕ = 58° 1700 (RR2)
	W.E.	
Cosmic Rays		
Green Corona		E. Limb 7 days earlier: NE- no data SE no data W. Limb 7 days later: NW- no data SW- no data
Indices		Rz: 7 10cm flux: 73 Flare: 0/19.4 Ca: 2.8 Ip: 0 Ia: 3
Solar Regions		14509 S04 (2) (14523) N37
Sunspots		


Nov. 17, 1976
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
SID
X-Rays
Ap 7
Kp
3- 3- 2- 2- 1+ 1o 1+ 2-
sc
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE- no data W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 14 10cm flux: 74 Flare: 4/22.0 Ca: 4.3 Ip: 0 Ia: 2
Solar Regions
Sunspots


Nov. 18, 1976
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
ns
Dkm
SID
X-Rays
Ap5 09
Kp
2+ 2- 1- 1- 1- 0+ 2o 2-
sc
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE no data W. Limb 7 days later: NW- no data 330° SW-
Indices
Rz: 20 10cm flux: 77 Flare: 7/12.0 Ca: 6.6 Ip: 0 Ia: 1
Solar Regions
(14526B) N21
Sunspots


Nov. 19, 1976
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
ns
noise storm
Dkm
SID
X-Rays
Ap 9
Kp
2+ 3+ 2- 1+ 2o 2- 2+ 2+
sc
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- moderately bright SE- W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 13 10cm flux: 76 Flare: 7/19.5 Ca: 8.1 Ip: 0 Ia: 2
Solar Regions
(14526A) N43 (14524) N06
Sunspots


Nov. 20, 1976
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
noise storm
ns
ns
Dkm
SID
X-Rays
Ap 7
Kp
2+ 2+ 1+ 2+ 2o 1- 3- 1+
sc
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- SE W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 12 10cm flux: 75 Flare: 8/17.9 Ca: 10.3 Ip: 0 Ia: 1
Solar Regions
(14533) S12 (14527) S05 14516 N30 (2)
Sunspots

Nov. 21, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES

Bursts: cm; dm; m — noise storm; Dkm

SID

X-Rays

Ap 4 Q6 — Kp: 1+ | 2- | 1- | 0+ | 1o | 0+ | 1o | 1+ — sc

Aurora: USSR; W.E.

Cosmic Rays

Green Corona — E. Limb 7 days earlier: NE- SE- W. Limb 7 days later: NW- no data SW- no data

Indices — Rz: 8 10cm flux: 75 Flare: 0/17.9 Ca: 10.7 Ip: 0 Ia: 3

Solar Regions — (14535) S43 (14534) S02

Sunspots

Nov. 22, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES

Bursts: cm; dm; m — noise storm; Dkm

SID

X-Rays

Ap 5 Q10 — Kp: 1o | 2+ | 1+ | 1o | 1+ | 1- | 2- | 1+ — sc

Aurora: USSR; W.E.

Cosmic Rays

Green Corona — E. Limb 7 days earlier: NE- SE no data 150° W. Limb 7 days later: NW- no data SW- no data

Indices — Rz: 13 10cm flux: 75 Flare: 6/20.4 Ca: 10.1 Ip: 0 Ia: 3

Solar Regions

Sunspots

Nov. 23, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES

Bursts: cm; dm; m; Dkm

SID

X-Rays

Ap 4 Q5 — Kp: 1+ | 1- | 1o | 0+ | 1- | 1o | 1o | 2- — sc

Aurora: USSR; W.E.

Cosmic Rays

Green Corona — E. Limb 7 days earlier: NE- no data SE- no data W. Limb 7 days later: NW- no data SW- no data

Indices — Rz: 11 10cm flux: 74 Flare: 0/18.8 Ca: 10.0 Ip: 1 Ia: 3

Solar Regions — 14528 N12 (14539) S15

Sunspots — 19733 N10 (Bp)6

Nov. 24, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES

Bursts: cm; dm; m — noise storm; Dkm

SID

X-Rays

Ap 3 Q4 — Kp: 0+ | 2o | 0+ | 1o | 1- | 0+ | 0o | 0+ — sc

Aurora: USSR; W.E.

Cosmic Rays

Green Corona — E. Limb 7 days earlier: NE- no data SE no data W. Limb 7 days later: NW- no data 300°,340°,355° SW-

Indices — Rz: 10 10cm flux: 75 Flare: 0/12.8 Ca: 9.2 Ip: 0 Ia: 4

Solar Regions — 14529 N30

Sunspots

Nov. 25, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES

Bursts: cm, dm, m, Dkm

SID

X-Rays

Ap 11 — Kp: 1+ | 3o | 3o | 3o | 2+ | 3o | 2+ | 2-

sc

Aurora — USSR: ϕ = 57° 1300-1600 (A,R2); ϕ = 56° 1600-1800 (HV1)

W.E.

Cosmic Rays

Green Corona — E. Limb 7 days earlier: NE- no data SE no data W. Limb 7 days later: NW- SW-

Indices — Rz: 9 10 cm flux: 75 Flare: 0/19.0 Ca: 7.2 Ip: 0 Ia: 5

Solar Regions

Sunspots

Nov. 26, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES

Bursts: cm, dm, m — ns —, Dkm

SID

X-Rays

Ap 9 — Kp: 2+ | 3- | 1- | 1+ | 1+ | 2o | 4- | 3-

sc

Aurora — USSR: ϕ = 58° 1200-1900 (SB2), 2000 (R_2B3) and 2100 (HA3)

W.E.

Cosmic Rays

Green Corona — E. Limb 7 days earlier: NE- SE- W. Limb 7 days later: NW- no data SW- no data

Indices — Rz: 9 10 cm flux: 74 Flare: 0/15.9 Ca: no data Ip: 0 Ia: 3

Solar Regions — (14540) S23 (14541) N04

Sunspots

Nov. 27, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES

Bursts: cm, dm, m, Dkm

SID

X-Rays

Ap 8 — Kp: 3- | 4- | 3- | 1o | 0+ | 1- | 2- | 2o

sc

Aurora — USSR

W.E.

Cosmic Rays

Green Corona — E. Limb 7 days earlier: NE- no data SE- no data W. Limb 7 days later: NW- no data SW- no data

Indices — Rz: 8 10 cm flux: 76 Flare: 0/15.1 Ca: 2.9 Ip: 1 Ia: 2

Solar Regions

Sunspots

Nov. 28, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES

Bursts: cm, dm, m, Dkm

SID

X-Rays

Ap 2 01 — Kp: 0+ | 1- | 0+ | 0+ | 0+ | 1- | 1- | 0o

sc

Aurora — USSR

W.E.

Cosmic Rays

Green Corona — E. Limb 7 days earlier: NE- SE W. Limb 7 days later: NW- no data SW- no data

Indices — Rz: 8 10 cm flux: 74 Flare: 0/20.8 Ca: 2.0 Ip: 0 Ia: 4

Solar Regions

Sunspots

Nov. 29, 1976	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
FLARES																									
Bursts cm																									
Bursts dm																									
Bursts m																									
Bursts Dkm																									
SID																									
X-Rays																									
Ap 6 Kp	0o				1-			2+			1+			1o			2+			1+			2+		
Ap 6 sc																									
Aurora USSR																									
Aurora W.E.																									
Cosmic Rays																									

Green Corona	E. Limb 7 days earlier: NE- no data SE- no data W. Limb 7 days later: NW- SW-
Indices	Rz: 8 10cm flux: 72 Flare: 0/19.1 Ca: 1.3 Ip: 0 Ia: 3
Solar Regions	(14536) N01 (14537) N30
Sunspots	

Nov. 30, 1976	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
FLARES																									
Bursts cm																									
Bursts dm																									
Bursts m																									
Bursts Dkm																									
SID																									
X-Rays																									
Ap 11 Kp	3o				4-			2o			2-			2+			3o			1o			2o		
Ap 11 sc																									
Aurora USSR	ϕ = 59° 1100-1300 (HA1)																								
Aurora W.E.																									
Cosmic Rays																									

Green Corona	E. Limb 7 days earlier: NE- no data SE no data W. Limb 7 days later: NW- no data SW- no data
Indices	Rz: 0 10cm flux: 72 Flare: 0/12.3 Ca: 1.3 Ip: 0 Ia: 3
Solar Regions	(14548) N04
Sunspots	

REGIONAL FLARE INDEX

INCLUDES ALL FLARES

MC MATH PLAGE NO.	LAT	CMP DATE	DATE FIRST FLARE	DATE LAST FLARE	FLARE-INDEX SUM	FLARE-INDEX MEAN	TOTAL NO. OF FLARES
14518	N23	76/11/12.0	76/11/17	76/11/18	3.47	1.73	3
14526	N12	76/11/23.7	76/11/17	76/11/22	27.85	4.64	16

Note:

Because of differences in method of calculation, the dates of Central Meridian Passage for the McMath Plage Regions vary somewhat from those given elsewhere. Any region not listed here produced no flares during its disk passage.

SGD 394 Part II (Comprehensive)

Miscellaneous Data

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COSMIC RAY INDICES
(Neutron Monitors)

FEB - MAR 1977

FEB. 1977	CALGARY Average cts/hr	SULPHUR MT Average cts/hr	MAR. 1977	CALGARY Average cts/hr	SULPHUR MT Average cts/hr
1	11750.3(23)	8989.6	1	11870.0	9127.1
2	11899.3	9035.9	2	11819.6	9118.4
3	11942.4	9078.0	3	11751.0	9049.3
4	11837.5	9061.5(23)	4	11715.6	9019.0
5	11740.3	9009.2	5	11665.2	8976.2
6	11843.9	9081.0	6	11635.3	8961.8
7	11723.7	8980.9	7	11659.0	9014.8
8	11665.1	8972.7	8	11675.7	8998.0
9	11678.2	8977.2	9	11675.0	9016.0
10	11735.5	9034.4	10	11725.5	9024.6
11	11779.0	9040.6	11	11758.5	9057.1
12	11782.5	9057.4	12	11797.7	9116.2
13	11849.4	9113.5	13	11911.2	9207.2
14	11861.1	9136.5	14	11961.1	9163.3
15	11962.5	9232.9	15	11939.3	9145.3
16	11868.2	9148.0	16	11951.0	9157.7
17	11920.7	9196.4	17	11963.7	9155.1
18	11730.0	9020.6	18	11898.9	9083.2
19	11675.1	8981.3	19	11776.5	9046.9
20	11690.6	9015.8	20	11825.3	9029.6
21	11695.0	9034.9	21	11845.9	9022.6
22	11759.3	9066.7	22	11880.5	9064.3
23	11787.4	9084.6	23	11822.0	9040.4
24	11786.2	9040.9	24	11856.0	9000.0
25	11814.1	9049.1	25	11829.5	8994.5
26	11843.2	9062.9	26	11799.3	8995.7
27	11849.2	9085.3	27	11751.4	8953.5
28	11878.2	9116.5	28	11724.4	8917.4
			29	11763.0	8940.4
			30	11801.5	8933.6
			31	11835.5	8986.3
MEAN	11798.1	9060.9		11802.7	9042.5

( ) Number of hours for which data are available if less than 24. Number of Section Hours at Climax if sum of both sections is less than 40 hours.

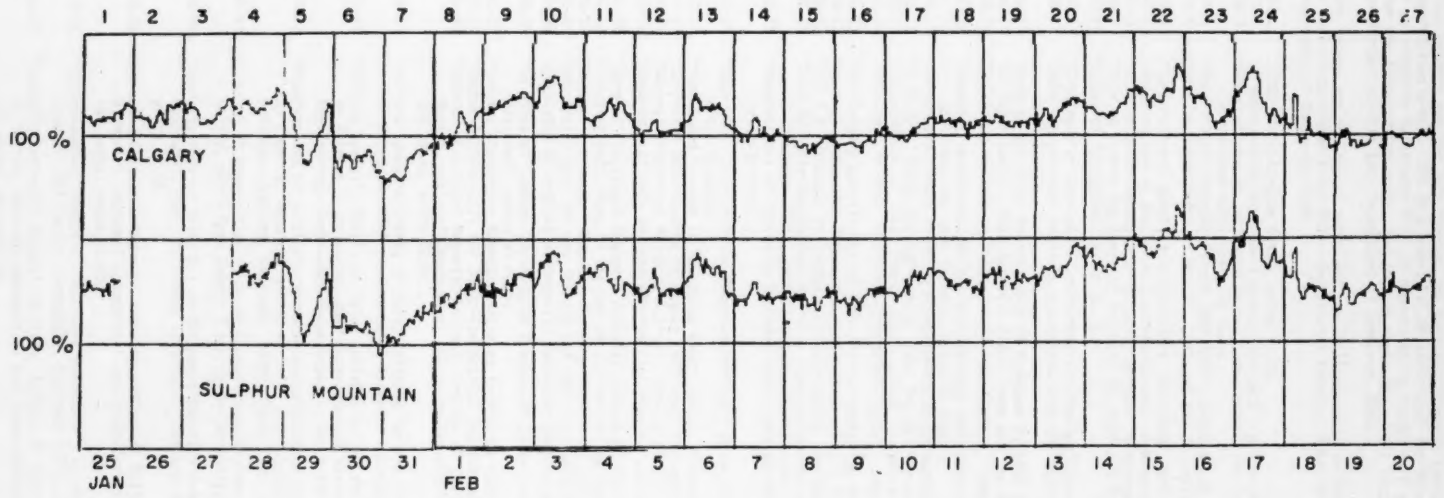
Thule, Alert, Calgary, Sulphur Mountain, Kiel and Climax Scaling Factors = 100.
Deep River Scaling Factor = 300.
Tokyo Scaling Factor = 128.

Due to the closing of the Geopole Station the Thule neutron monitor operations were temporarily suspended at the end of May 1976. Operations have been resumed but data are still not available for publication.

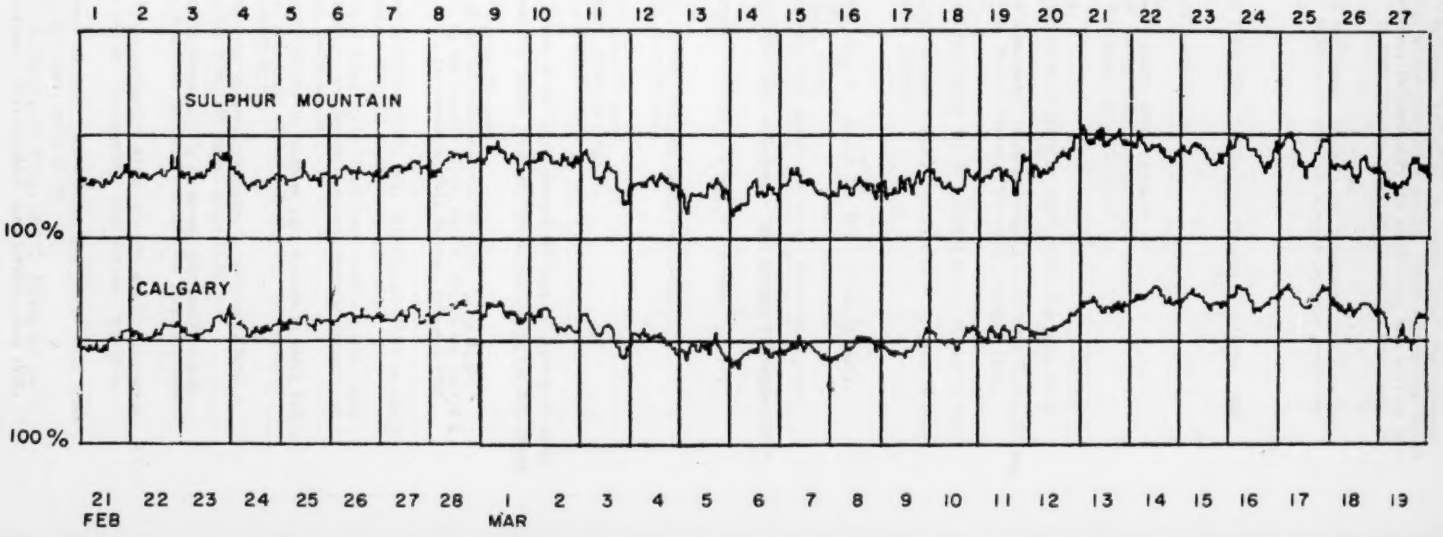
COSMIC RAY INDICES
(Neutron Monitors)

COSMIC RAY INDICES
(Neutron Monitors)

Bartels Rotation 1962 (January - February 1977)



Bartels Rotation 1963 (February - March 1977)



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